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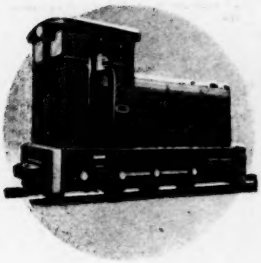

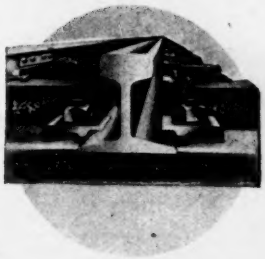

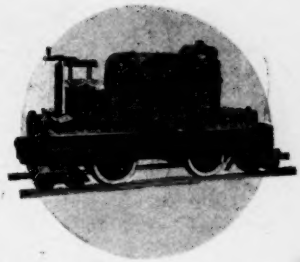

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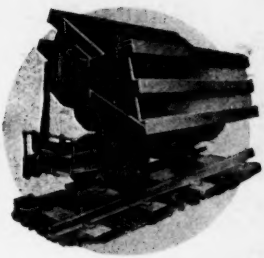

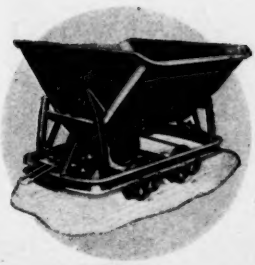

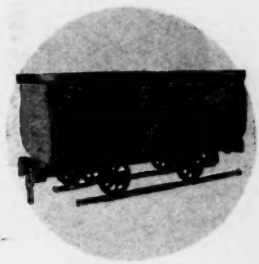

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CONTENTS

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NOTES AND COMMENTS

The Outlook for Bolivia

Bolivia—that "most distressful country"—has once again been the scene of a revolution. Ever since Bolivia attacked Paraguay in the endeavour to wrest from her the Northern Chaco in 1932 the economic stability of the republic has been gradually worsening, and in recent years there has been a succession of revolutionary movements, generally ending in a military *Junta*. Señor L. T. Sorzano was deposed from the Presidency in 1936; Colonel Toro in 1937; General Busch committed suicide in 1939; General Peñaranda was deposed in 1943. His successor, Major Villaroel, was deposed and lynched in 1946, and was succeeded by Dr. Guillen who held office for three weeks, and was succeeded by Judge Gutierrez who some six months later was succeeded by Dr. Henrique Herzog in 1947, who resigned on grounds of ill health in 1949, when he was succeeded by the Vice-President, Señor M. Urriolagoitia, whose tenure of office was terminated by a military *Junta* whose leader, General Ballivian, remained in power until this last revolution. This is a fairly stormy record even for a South American republic.

So far we have only scrappy accounts of the last revolution which started last Tuesday week and resulted in the victory of what is termed the Revolutionary Nationalist Movement on the following Friday. No reports seem to have come through direct from La Paz, where presumably a strict censorship has been established, but from messages from the Argentine and Chile it would appear that the revolutionaries were only successful after a bitter struggle in which the fortunes of either side fluctuated dramatically. Generally speaking, Bolivian revolutions, with the exception of the revolt which led to the death of Major Villaroel have been almost entirely bloodless, but on this occasion there was heavy loss of life, estimated at between 450 and 2,000 soldiers, police and civilians in La Paz alone; with extensive casualties in the provincial cities, of which Cochabamba has a population of some 77,000, Oruro 50,000, Potosi 40,000, Santa Cruz 33,000 and Sucre 30,000.

The issue seems to have been decided by the military with the force at the air base becoming a determining factor. After the revolution had apparently succeeded, some two regiments of the military joined General Ballivian when the revolutionary leader, General Seleme, believing the cause was lost, took sanctuary in the Chilean embassy. Whereupon, Dr. Hernando Silez, either better informed, or more determined, continued the contest, and eventually, with the adherence of the air force triumphed: General Ballivian followed General Seleme to the Chilean embassy. A revolutionary committee was set up, and Dr. V. P. Estensoro, who has lived in exile in Buenos Aires since 1946 and was elected president in the 1951 elections *in absentia* but whose return was prevented by General Ballivian's *coup d'état*, has been proclaimed President. Associated with Dr. Silez was Señor Juan Lechin, the miners' leader. The victorious revolutionary committee has announced that one of the first acts of the new government will be to nationalise the tin mines, which had already been threatened on several occasions.

It now remains to be seen whether the new régime will prove more stable than its predecessors. Economically, they appear to be facing a tremendous task, dependent as Bolivia's finances are almost entirely on how much money can be extracted from the tin mining industry. It is this condition which has caused the late Bolivian government to demand from the United States a price far in excess of that accepted by Britain (Malaya and Nigeria), Indonesia, and the Belgian Congo, with the result that the United States since the end of last June has purchased little or nothing of the Bolivian output, and this, according to a recent statement by the Large and Medium Miners' Association, has caused Bolivian tin stocks to accumulate for the past nine months, though this is probably something of an overstatement. Negotiations regarding a price acceptable to Bolivia have been deadlocked for months, though it has been rumoured recently that Bolivia might accept something below her original demand of 150c. per lb.

It is difficult to see on any economic grounds why the United States should be called upon to pay more than what is the *quasi* world price of 118c. per lb. f.o.b. agreed upon with the other major producers. How far the claim

that 118c. would result in a large portion of the Bolivian industry being put out of commission is based on the financial exigencies of the Bolivian government, and how far it represents the inability of the mining population to continue working with tin at a reduced figure, it is impossible to judge; the miners having no alternative occupation would be forced to accept a still lower standard of living or starve. In any case it is unlikely that the larger and richer mines will be closed down, especially if all the mines are nationalised as the new government propose to do.

Unless the United States is prepared once more to act as a fairy god-mother, it is only reasonable to anticipate a considerable decline in Bolivian tin output, especially as no new deposits are said to have been discovered in the country for over 30 years. This is in line with expectations which have been expressed in *The Mining Journal* for a considerable time past and so long as the world output exceeds consumption by something like 25,000 tons a year, there is no need for anyone except the Bolivians themselves to worry over the outlook.

What the future for that country may be is another matter and for some time past the possibility of Bolivia being absorbed by its neighbours and ceasing to exist as an independent state has been canvassed in South America. All we can say at the moment is that economic considerations in the long run must be paramount and all governments sooner or later must conform to this necessity.

The question naturally suggests itself whether opinion in the United States is still so unanimous on the necessity of maintaining the Texas smelter in full commission, that Bolivia will have to be sustained from outside in order to secure supplies which probably no other smelter would care to entertain. During the last nine or ten months we have seen the output from the Longhorn Smelter approximately halved and it is obvious that the United States can buy all the tin it wants in the form of metal smelted more cheaply abroad and at best Bolivia has not been supplying more than about half the Longhorn output; indeed, a considerable part of that can only be smelted economically by the admixture of rich Indonesian, Siamese, and Congo concentrates. Looking at the position broadly the present tin price of, say, £950 per ton f.o.b., appears a reasonable one and calculated to maintain the current rate of world output for a sufficient number of producers to keep production and consumption in balance for an extended period.

Uganda Copper Development and Railway Extension Project

Reference was made in *The Mining Journal*, January 11, to the report made by a Government Economic Survey Committee on the practicability of extending the Uganda railway system 200 miles westward from Kampala (near the north shore of Lake Victoria) into the neighbourhood of the Kilembe copper deposits. Moreover, this committee urged that the Kilembe copper-ore should be transported to Jinja (near campala) for refining and it considered that the hydro-electric power schemes of the Government of Uganda on the Nile would enable an electric smelter to deal with the concentrates on an economic basis. However, Kilembe Mines, Ltd., has just announced that it intends to establish an extraction plant at Kilembe instead of carrying out its earlier plan to process the ore at Jinja. Also, the mine is to be provided with its own electric power derived from mountain streams instead of obtaining it from the above mentioned scheme at Owen Falls. These decisions are expected to affect adversely the plans of the Uganda Government to extend the railway westward from Kampala.

Canada's Record Mining Production

Addressing the Montreal Branch of the Engineering Institute of Canada on March 13, the Minister of Resources and Development, Mr. Robert H. Winters, announced that last year Canada mined a record $1,228,000,000 worth of strategic and other minerals. In fact, the industry's output was comprised of at least 65 different mineral products. Canada ranked first, he said, in production of the world's nickel, asbestos, and the platinum metals; second in aluminium, zinc, gold, cadmium, selenium, tellurium, and probably radium and uranium; third in silver, and fourth in the production of lead, copper and cobalt.

"Records of production that have been achieved by the present programme of development and our natural resources are merely a step along the way of realizing our vast potential," Mr. Winters pointed out in an address delivered on March 19, at Shawinigan Falls, P.Q. "Some of the most spectacular projects are still in what may be described as the 'tooling-up' stage as we lay solid foundations for future expansion.

"Major developments," he added, "are taking place from coast to coast, and some of the most important are centred on the fringe—and beyond the fringe—of present day settlement. In the North-west Territories and Yukon, problems of weather, distance, and transport are being solved to bring the rich mineral resources within reach. Four mines in the Yellowknife District of the North-west Territories produced over $7,500,000 in gold during 1950.

"Nickel and copper deposits located on Arctic and eastern Arctic shores are being re-examined. At Pine Point, on the south shore of Great Slave Lake, lead-zinc deposits are undergoing thorough exploration as the potential site of a really large-scale mining operation. A total of 1,099 mineral claims were staked in the district during the past year.

"Hydro-electric power for the development of resources and industrial expansion is being produced at an unprecedented rate, and still, with 13,340,774 h.p. capacity installed, we have harnessed barely one-quarter of our known potential.

"It is estimated that more than 1,700,000 h.p. of new hydro-electric capacity will be brought into operation before the end of 1953 and an additional 2,000,000 h.p. by the end of 1955.

"The years 1953-55 are highly significant in the programme of resources development. It is estimated that within this period, iron ore production north of Lake Superior may be tripled, to reach 10,000,000 tons annually. From Labrador-Ungava it is expected that iron ore shipments will begin in 1955 with an initial annual output of 5,000,000 tons. Given the St. Lawrence Seaway, production from these vast deposits might reach 20,000,000 tons annually."

Turning to Canada's nickel-copper deposits, Mr. Winters declared that those found at Lynn Lake in northern Manitoba should be brought into production by 1953 with the expectation of attaining an annual output of 8,500 tons of nickel and quantities of copper sulphide and cobalt by 1955. The Aluminium Co. of Canada project in British Columbia was expected to bring in from 80,000 to 100,000 tonnes of new aluminium capacity by 1955.

"Oil production has been increased in five years' time from the point of supplying only 10 per cent of our domestic requirements, to the equivalent of close to 50 per cent to-day, and the story is still unfolding."

Brazil

(From Our Own Correspondent)

Teresopolis, March 25

The list of materials which may be imported into Brazil without prior licence during 1952 includes: machinery, apparatus, instruments, spare parts and materials for the exploitation and industrialization of mineral products and for the manufacture of cement; equipment for crushing and concentrating minerals, including all kinds of crushers, mills, screens and scrapers, with motors and accessories, classifiers, filters, jigs, oscillating platforms, flotation cells and reagents, separators, concentrators, sand and mud pumps; equipment for surface and underground mining, including hand, pneumatic and electric tools, cradles, oilers, drills, apparatus for explosives and well-lining, coal-cutters, cranes, shovels, cages, rotating platforms, mechanical filters and machines for reconditioning tools; equipment for metal-works, including open-hearth and electric furnaces, converters, loaders, mixers, air and gas valves, lifting and conveying machinery, slag trucks, presses, installations for dolomite, carbon electrodes and pastes.

INDUSTRIAL DEVELOPMENTS

A Brazilian company inaugurated a factory at Volta Redonda in December to manufacture 10,000 bags of metallurgical cement daily. It will use liquid slag from the adjoining blast furnaces. Two other companies have been formed, one associated with Halliburton Cement, of Oklahoma, to manufacture portland cement in the States of Rio and Espirito Santo. Brazil produced about 1,300,000 tons of cement in 1951.

A Detroit furnace, the first of its kind in Brazil, is being built at Belo Horizonte to render apatite soluble in citric acid. The nearby Araxa reserves are estimated at 90,000,000 tons of industrial apatite, containing 20-30 per cent P_2O_5 and 10-20 per cent Fe_2O_3.

Companhia Estanifera do Brasil is installing an electric furnace at Volta Redonda to process cassiterite from the S. Joao del Rei deposits. It will be equipped to reduce 3,000 tons of concentrates annually.

Plant for producing 5,000 tons of electrolytic copper annually will begin operating at Utinga, S. Paulo, in 1952, using concentrates from the Camaqua and Itapeva deposits (see *The Mining Journal*, June 8, 1951). Domestic requirements are estimated at 37,000 tons in 1952.

A French-Brazilian group will make Diesel motors in Minas Geraes; a Brazilian company (I.R.F.A.) is building Diesel engines for the ex-British Leopoldina Railway and the German Krupp interests will build locomotives in S. Paulo. A.C.F.-Brill Motors is to make buses there, a Brazilian-Italian company is making motorcycles and commercial vans, the French Schneider group is to manufacture lorries and tractors in Minas Geraes, the National Motor Factory is producing lorries under an Italian patent and the first Brazilian-built farm tractors were displayed at the recently-held S. Paulo Industrial Exposition.

The Independent Pneumatic Tool Co. will manufacture its products through a S. Paulo subsidiary and a German firm has installed plant to make screws.

The newly-formed Companhia Siderurgica Mannesmann held its first meeting in February. Mannex do Brasil is subscribing 51 per cent of the £8,000,000 capital in plant and rights to manufacture Mannesmann products, and Mannesmann Roehrenwerke is supplying plans and technical administration. The plant, located at Belo Horizonte, will have capacity for 250,000 tons of steel, 60,000 tons of seamless tubes, of ¼ in. to 8 in. diameter, 18,000 tons of fine steel, wire and steel strip. Federal and State governments are extending valuable facilities to the company which should begin making tubes in 18 months.

Volta Redonda has obtained $U.S.25,000,000 credit from the Export-Import Bank to increase capacity. The additional equipment to be installed includes blast furnace, 21 coke ovens and two O.H. furnaces. In 1951, the national steelworks produced 342,000 tons of iron, 465,000 tons of steel ingots and 342,000 tons of rolled products. The first stage of the expansion programme will raise the output of steel ingots to 680,000 tons, while the second stage aims at 1,000,000 tons of ingots and 760,000 tons of rolled products.

Ceylon

(From Our Own Correspondent)

Colombo, March 19

Geological surveys and economic investigations carried out on a large scale by the Department of Mineralogy in Ceylon from 1947 to 1951 have brought to light important information regarding deposits of kaolin, thorianite, monazite, glass sands and iron ores, according to the Administration Report of the Government Mineralogist, Mr. L. J. D. Fernando, which has just been issued. This report, the first in five years, states that several causes were responsible for the delay since the last report, chief among which were lack of adequate staff and general disorganization caused by the war.

The Mica Branch of the Department, inaugurated in 1942, continued to function usefully during the early part of the period under review. Besides the usual routine of passing and grading mica purchased by the Department on behalf of the Anglo-American Mica Mission, advice was given on mining, curing, and grading of the mineral. New mica occurrences at Polonnaruwa and at Galkaduwa in the Ratnapura District were investigated. Although every assistance was given by the Department to persons engaged in the mica-mining industry, production continued to be small and was confined to the lower grades, but a definite improvement was evident in the curing and grading of the mineral. With the termination of the mica-purchase scheme, most of the mines closed down and there has been no revival of interest in this industry.

Preliminary investigations have revealed the occurrence of between 5,000,000 to 6,000,000 tons of iron ore in scattered deposits mainly in the south-west sector of the island. The ore occurs mainly on the surface, or within a few feet of it, in the form of small nodules and boulders, varying in size from a few inches to several feet across. Out of the total estimate of 5,000,000 to 6,000,000 tons of ore, only a little over 2,000,000 tons occurs in sufficient concentration and close to main lines of communication to be of commercial importance.

GOLD DECLINES SHARPLY

Gold prices in Ceylon have registered a sharp decline. This is attributed to the fall in gold prices in India and the decline in prices in the leading markets of the world.

A sovereign weight of 22 ct. gold which fetched Rs. 72 is now fetching between Rs. 65 and Rs. 67. The minted sovereign has also, in keeping with this trend, shown a fall of about Rs. 5 per sovereign, the latest quotation being Rs. 80 for a sovereign.

Prices in the open market, however, are considerably higher than the price at which the Central Bank of Ceylon sells gold to craftsmen on permits issued by the Department of Industries. The Central Bank charges Rs. 240 for an ounce of 22 ct. gold which works to about Rs. 62 for a sovereign weight of gold.

COLONIAL MINERALS DEVELOPMENT—VII

British Borneo's Mineral Wealth

By A. G. THOMSON

In the following article—the seventh in a series devoted to the mineral wealth of the smaller British overseas territories—reference is made to the extensive yet insufficiently known deposits occurring in the British Territories in Borneo—i.e., North Borneo, Sarawak, and Brunei, and to the steps taken for their exploration by the newly established Geological Survey.

The Geological Department of the British Territories in Borneo was established in 1949. Its field of operations comprises the Colonies of North Borneo and Sarawak, and the State of Brunei, the total area involved being approximately 80,000 sq. miles. The island of Borneo has long been a very large producer of oil, and Brunei's output is now the highest of any country in the Commonwealth. Since 1911, nearly 200,000,000 bbl. of crude oil have been produced in Sarawak and Brunei. The combined output from both territories amounted in 1950 to 30,957,672 bbl. and the value of oil exported to 230,308,089 Straits dollars.

Situated on the north-west coast of Borneo, Sarawak lies on the shores of the China Sea, just north of the Equator. Occupying some 47,000 sq. miles, it consists of coastal lowlands, bordering mountain ranges that form much of the interior. The population totalled 546,385 in 1947.

The natural resources of Sarawak are the subject of a recent publication by F. W. Roe (1). From 1823 onwards, when it was discovered that antimony ore had a ready market in the newly-established trading centre of Singapore, minerals have played an important part in the economy of this territory. The five minerals that have been most extensively worked are oil, gold, antimony, coal and mercury.

INCREASING IMPORTANCE OF SARAWAK OIL OUTPUT

The discovery of oil resulted from geological investigations started in 1909 on behalf of the Royal Dutch-Shell Group. Oil was struck at Miri the following year and a company with a capital of £500,000 was formed. The first shipment was made in April, 1913, and production has since been continuous, the total up to December, 1950, being 71,627,196 bbl. (this figure includes the production estimated to have been made during the Japanese occupation). Over $10,000,000 in royalties has been paid to the Government of Sarawak. In 1929, oil was found at Seria in Brunei territory, some thirty miles north-east of Miri, and it is from this area that the main production of the British Territories in Borneo is now derived. Almost all the oil is obtained from sands of the Upper and Middle Miocene series, the depths of the wells ranging from 300 to 3,050 ft. in the Miri area and from 1,600 to 6,000 ft. at Seria.

GOLD PRODUCTION

From 1864 to 1950 inclusive, the recorded production of gold has been 1,210,511 troy oz., which has brought the Sarawak Government a revenue of nearly $2,500,000 in royalties, rents and licence fees. The peak period of production followed the introduction of the cyanide process by the Borneo Co. Ltd. in 1899. This undertaking closed down early in 1922, after which mining was confined to small-scale operations by Chinese miners. Since the liberation of Sarawak in 1945, there has been a small but increasing output which amounted in 1950 to 1,440 troy oz. Though gold has been recorded in a number of widely separated areas, most deposits appear to be too small, too irregular, and too poor to repay mining at the present time. The Bau district of Upper Sarawak has been the source of practically all the gold produced. This accessible field has been extensively prospected in the past, however, and unless alluvial deposits are found in the vicinity, it is doubtful whether it can ever regain its former importance.

The main deposits of antimony ore are situated in Upper Sarawak and consist mostly of the sulphide, stibnite. After 1840, production was rapidly stepped up to about 1,500 tons annually and for many years the country was the chief source of European supply. Since 1907, however, only small quantities of antimony ore have been obtained at irregular intervals.

COAL DEPOSITS

Coal has been recorded at many localities in Sarawak, the best known deposits being at Sadong, the Silantek-Abok area, the Bintulu area, and Muka. Certain deposits are reported to contain coal of good quality, but development has been hindered in the past by inaccessibility, competition from coal exported from Europe, and the small market in the country itself. Collieries were once operated by the Sarawak Government at Sadong in West Sarawak and Brooketon in Brunei territory. Between 1874 and 1931, a total of 1,458,757 tons of coal were sold by the Sarawak Government, most of which was consumed by local companies and steamers.

Mercury occurs mainly as the sulphide, cinnabar, but small amounts of the metal itself have been recorded. The main period of production was between 1870 and 1899, when it is recorded that $1,159,966 worth of mercury was exported. Since 1899, there has occasionally been a small output. During the Japanese occupation, 103 flasks of mercury were obtained, this production being no doubt undertaken to obtain strategic supplies rather than as an economic success.

MANY OTHER MINERALS

The mineral resources of Sarawak also include limestone used for lime manufacture and possibly suitable for cement, clay used for bricks and some types of pottery, building stone, and phosphate. Small occurrences of gypsum and ores of silver, lead, copper and iron have been recorded.

Though little has been published about Sarawak's minerals and few production or investigation records are available, a considerable amount of prospecting has been carried out. Between 1850 and 1900, there appears to have been an energetic search for minerals, but unfortunately none of the geological and mineral results of this work were published. The oil fields of north-east Sarawak and the gold in the west are the mineral deposits that have received the closest examination, but much work has yet to be done before the potentialities of these regions are known. Though mineral occurrences are widely reported, the limited information available suggests that most deposits are too small or too difficult of access to represent economic mining propositions at the present stage of the country's development. Their investigation, however, is among the first tasks to be undertaken by the Geological Survey Department.

The Colony of North Borneo—which has an area of about 30,000 sq. miles—is a mountainous country lying entirely within the tropics. According to the 1931 Census, it had only 270,223 inhabitants. As in Sarawak, the hot and humid climate causes vegetation to grow luxuriously, and geologists are hampered not only by the dense jungle, but also by an exceptional thickness of soil which tends to disguise the real nature of the rocks.

Until recently, less was known about the geology of North Borneo than about that of most other countries, although it is probable that more geological work had been done in certain parts of the territory than in any other British Colony except Trinidad. As in the case of Sarawak, it was therefore necessary for the newly established Geological Survey to concentrate on the assembly of records of past mining and exploration. The absence of correlated information regarding past work in Borneo has recently been largely remedied by the publication of a comprehensive report by Reinhard and Wenk, based on all known sources of geological information, published and unpublished (2). This valuable work was sponsored by the Shell Company and published as Bulletin No. 1 of the Geological Survey Department.

In 1934, the Anglo-Saxon Petroleum Co., a member of the Shell Group, was granted a concession by the British North Borneo Company. Geological exploration was started with the assistance of Sarawak Oilfields Ltd. in October of the same year and has since been extended by the addition of aerial, photogeological, and geophysical surveys and core-drilling. In 1938, Anglo-Saxon assigned its interest in the concession to the Shell Co. of British North Borneo, Ltd.

The data obtained from these surveys throw light on the geological history and structure of Borneo and help to fill in the still incomplete geological picture of the East Indies as a whole. Hitherto, knowledge of North Borneo has been based almost exclusively on the findings of the field geologists of the oil companies, and on the palaeontological and petrographical examination of their rock samples. Though Reinhard and Wenk were concerned with the work of both oil and mining companies, unfortunately the activities of the latter were usually more in the nature of prospecting operations than of geological mapping, so that it scarcely came within the scope of this particular publication. However, the report of the Geological Survey Department for 1949 gives in summarized form the results of the work of mining companies and prospectors, which could only be dealt with to a very limited extent by Reinhard and Wenk.

The Department's report for 1950 has recently been published and contains the results of the field work of the Geological Survey up to the end of that year (3). Despite the destruction of the Department's Jesselton office by fire in June, 1950, considerable progress has been achieved in the assembly of records of past investigations and in systematic mapping and exploration.

BAUXITE DEPOSITS DISCOVERED

An early success was the discovery of bauxite deposits in South-West Sarawak which are now being prospected in detail by the British Aluminium Co. Ltd. Fourteen bauxite occurrences have been found, two of which may be payable, and large areas believed to include country geologically similar to that where the original discovery was made have yet to be examined.

The Survey has concentrated much of its attention on coal deposits at Silantek in Sarawak and Silimpopon in North Borneo, with a view to determining whether the good quality coals known to be present in these deposits are available in sufficient quantities to pay for mining. The report from Silantek is still incomplete, but so far 1,000,000 tons of coal are estimated to be present at Silimpopon. It is understood that commercial companies are negotiating for the right to drill there. In view of the growing industrialization of Australia and the Far East and the possible development of iron ore deposits in neighbouring territories, these Bornean coking coals might well be in demand by the time the mines can be brought into production.

In Sarawak, a geologist is mapping in detail the Bau area where gold and ores of antimony and mercury have been mined, and he is making a regional survey of the surrounding country. Some alluvial gold occurrences reported by the survey are being tested by a mining company.

Antimony ores are being investigated, partly to determine whether any important deposits of primary ore remain in the old mining areas, and partly to find out the geological association and mode of occurrence. This knowledge will then be applied to the search for new deposits in the relatively unexplored parts of the region. Phosphate in the form of cave guano is being examined and over 33,000 tons have been mapped in Sarawak. This material is in considerable local demand as a fertilizer. Potential sources of building materials are also being examined.

Now that all existing knowledge has been assembled, it is possible to give considerable assistance and information to other Government Departments and to mining and building concerns. The collection of regional information has proved useful in the search for oil, and the extensive exploration programme in progress has been so planned as to avoid any overlapping with the investigations conducted by the geologists of the Shell Group.

PHOTOGEOLOGICAL METHODS USED IN MAPPING

Geological mapping has been speeded up by the use of modern photogeological methods, but even so some years must elapse before geological maps of a type available in many other Commonwealth countries can be prepared. Apart from their intrinsic worth as maps, photogeological interpretations are assisting the geologists to concentrate their field investigations in suitable areas, and to overcome the difficulties resulting from bad communications, rare rock exposures, and slow travelling in jungle-covered swamps and mountains.

The success of the oil companies affords eloquent testimony to the benefits which can result from energetic and systematic exploration. Prospecting for minerals, however, has for the most part been intermittent and uncorrelated. It is believed that the establishment of a Geological Survey Department which can co-ordinate effort and prevent wasteful repetition may well lead to the discovery of additional mineral deposits. The importance of the Survey to the economy of British Borneo can be seen from the value of the territory's mineral output which, in 1950, was valued at nearly £24,000,000.

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The Preparation and Dressing of Non-Ferrous Ores in the U.S.A.

By F. BICE MICHELL

The following is the third and concluding part of a lecture to the Cornish Institute of Engineers delivered on Feb. 21, 1952, in which the author, who is the Head of the Department of Mineral Dressing at the Camborne School of Mines, describes a few outstanding plants and interesting practices observed while he was in the United States last spring as leader of an O.E.E.C. Mission. The aim of the mission was to study techniques and machinery used in the U.S.A. for the preparation and dressing of non-ferrous and non-metallic ores. On this mission the author represented the interests of the Malayan Chamber of Mines. In this part of the article, the reader will find further details pertaining to the more important developments in processes and machinery in the U.S.

Crushing practice is fairly standard, using jaw and cone crushers. For finer reduction, however, rod mills are replacing rolls. The hammer mill does good work on fluorspar in the Rosiclare district and, I think, with the increased availability of hard alloys to withstand abrasion, they may become more popular on more siliceous ores. This type of crusher has never been very popular probably because of the high silica content of many ores, but the fact that it can break along lines of weakness and cleavages makes it useful where selective crushing is desired. They can be worked with up to from 2 to 4 per cent moisture as a dry mill or as a purely wet mill.

GRINDING

Here, the Tricone mill running at relatively low speed is an important development. The special section is designed to counteract ball migration and maintain the large balls near the feed end of the mill. The tendency towards lower speeds, although it reduces capacity, makes for a saving in power. The use of Micarta Bearings which possess a friction coefficient of only one-half that of a normal bearing is also expanding, and a saving of up to 7 per cent in power has been reported. The central discharge rod mill is worth consideration for special grinding problems.

SCREENING

There are five important developments:

(1) The use of stay clean balls which tend to strike the underside of the screen and so clear it.

(2) The use of periodic surges to clear blinding on electrically vibrated screens.

(3) The use of repulping pockets to increase efficiency of washing particularly on flat screens such as the A.C. low-head.

(4) The covering of punched plate with rubber to increase life.

(5) The development of electrically heated mesh to prevent clogging with slightly damp ore, employing a large current at low voltage which is allowed to pass through the mesh and so slightly heat the wires.

CLASSIFICATION AND DESLIMING

There is little to report except the use of the D.S.M. cyclone for desliming at from 150 to as fine as 10 microns and I feel that this machine could be used with advantage to de-sand some slime-plant feeds.

Two types of automatic control gear are in use, employing the reduction in pressure in the vortex as the intelligence. The hydroscillator also is a much more efficient machine than the normal rake classifier and developments should be watched.

Both the Buckman frame and the Humphreys spiral deserve more attention in Cornwall. The former probably does not do much better work than the round-frame when worked properly, but so many are worked badly or receive little or no attention. The spiral has a limited application and is useless on most minus 200 mesh material for high sp. gr. sand or very coarse material (say plus 10 mesh) but for concentrating fine alluvials or scavenging tailing from sand tables, it can be extremely useful and tests made at King Edward Mine (experimental mine of the Camborne School of Mines) show that it can upgrade a low-grade tailing, so that it is justifiable to grind the concentrate produced for further treatment on a table.

In this connection, the use of rubber paint to prevent wear is also worth considering in a number of instances. The use of dry tabling is also worth attention. This has been developed in the United States but in this country we have a better machine in the Knapp & Bates table.

FLOTATION

Time does not permit to go into any detail, but the lessons to be learnt by studying the flowsheet of the Tennessee Copper Co. is the recovery of copper from a complex ore and the utilization of many of the minerals. By-products from our tin mines might be utilized in a similar way. The employment of flotation to make clean felspar is nothing more than could be done in Cornwall, and it only remains to be ascertained whether the grade of any granite is such that it could be processed and converted in saleable felspar and quartz sand. Metallurgically, it is feasible and similar processing is a commercial success in the U.S.

ELECTROSTATIC SEPARATION

As far as unit processes are concerned, this is definitely the most interesting and has many applications. One of the most promising at the moment is in the separation of monazite from ilmenite in alluvial tin deposits where a combination of this method and magnetic separation can make an excellent concentrate and a high recovery of monazite.

It has advantages over magnetic separation for many minerals as the actual current used is so small, only a matter of 200 watts or so compared with a much greater consumption of power in the case of a magnetic separator for the separation of a mineral such as ilmenite.

An excellent separation of good conductors such as pyrite, haematite, ilmenite, rutile, and cassiterite can be made from non-conductors such as zircon, monazite and mang. silicate minerals.

A four-roll machine will handle 10 tons per hour (each roll being 60 in. long and 6 in. diam.) and will treat material from 20 to 200 mesh. Unlike the early machine, the modern counterpart makes a high degree of separation, being as much as 85 to 98 per cent "per pass."

It can be used to remove haematite or other iron oxides from glass sand, and, indeed, shows considerable promise in mineral dressing.

As far as china clay drying is concerned, I feel that in the West of England generally we have developed better handling methods. However, the Proctor-Swartz continuous conveyor drier seems ideal for clay and is used in Georgia. The secret is to extrude the plastic clay through "dies" in a spaghetti like form so that it can be quickly dried in the perforated pans on the conveyor.

AUTOMATIC CONTROLS

These are developed to a much greater extent in America and not only reduce labour costs, but are capable of controlling conditions within narrower limits than many manual operations.

Such controls now include automatic feed control to grinding mills such as the electric ear, density controllers in grinding and on heavy media plants; *pH* recorders and controllers and automatic reagent control, the feed being related to the oxidation of the minerals (an oxidized ore usually requires more flotation reagents).

We in Britain have the technical "know-how" to use an American expression, and, provided we are given the chance in the form of the removal of an unequal burden in taxation of mining enterprises as well as the restrictions of town and country planning, with a little encouragement for research and technical education, which is sadly lacking, we could win a great deal more from the bare bones of this island. There is one other prerequisite and that is the attitude of mind both by management and the worker. U.S. management is usually less conservative and more willing to try out something new, whilst labour is willing to work harder for a good wage. (In this connection it would be unfair to fail to mention the enterprise of English Clays, Lovering, Pochin & Co. Ltd., who are an outstanding example of a firm making use of a sound research laboratory and are now planning ahead by this means.)

Apart from the better known mineral deposits of tin, tungsten, lead, and zinc, there are possibilities of increasing home production of fluorspar, barite and numerous non-metallic minerals as well as adding others to the list.

POSSIBLE APPLICATIONS IN CORNWALL

In Cornwall, we could do worse than investigate a number of new applications in tin dressing, such as the Humphrey's spiral for treating sand tailing and low-grade material, the use of more efficient screening and classification, the application of cyclones for a better sand/slime cut before slime plant, the use of the Buckman frame, increased automatic controls, and the systematic checking of losses, as well as the better utilization of by-product minerals.

Titanium at St. Keverne

By C. K. G. LAMMING

The following article gives particulars of the black beach concentrates of ilmenite occurring at Godrevy Cove to the south of Porthoustock in Cornwall, which may contain economic quantities of titanium of importance during an emergency. However, no claim is made that it represents a thorough survey of the extent and possibilities of the deposit.

Although it is only during comparatively recent years that titanium has become important in the metallurgical world, its existence in Cornwall has been known since the middle of the 18th century. At about this time a miller, who removed to Manaccan from the then flourishing copper mining district of Gwennap, noticed a heavy black sand in the pool which fed his mill wheel. Although tested for copper with disappointing results, the rector of Manaccan, the Rev. Mr. Gregor, sent samples of it to London for analysis, when it was shown to be an ore of titanium, then newly discovered by Klaproth. It was then named Gregoite, or Mannaccanite, and is to-day called ilmenite.

Although sundry specimens of the sand were sent to various museums, its occurrence attracted little attention and has remained only of historical and mineralogical interest.

It is, however, more widespread in the area than generally supposed, but nowhere, at the moment, does it form an economic deposit.

From the stream below Manaccan, discharging into Gillan Creek, and from the streams which flow down Porthallow and Porthoustock, this mineral can be recovered by careful panning.

PORTHOUSTOCK OCCURRENCE

It is, however, at Godrevy Cove, a little to the south of Porthoustock, that true black beach concentrates of ilmenite can be seen, reaching 80 per cent mineral in places where water seepage through the rocks and over the sand at the southern end of the beach removes the lighter material. Of possible economic interest is the fact that a small stream, in the winter months of quite substantial volume, flows over the pebbles in the centre of the beach, carrying all the sand down to low water mark, at ordinary tides. At low spring tides, a sand bar is visible some 30 or 40 ft. out, and bearing in mind the strong currents which sweep in and out of the Helford estuary, it seems that this bar may contain economic quantities of titanium more particularly during an emergency when overseas supplies are not easily available.

CONCENTRATION EASILY EFFECTED

The concentrates obtained by panning and electromagnetic separation from the river gravels generally appear to be more dull and impure as compared with the bright metallic concentrates obtained from the beach and while liberation of the particles is not complete in the former, it is complete in the latter, where particle size varies very little and concentration may be easily effected by screening, to remove waste grit, followed by Humphries spirals and/or sand tables. Electrostatic separation would be necessary if any other heavy minerals should be found to be present.

Analysis of the river gravel concentrates after magnetic separation showed no trace of other minerals usually associated with ilmenite, but it seems likely that some zircon may be found in the beach deposits as this is present as an accessory mineral in some of the schists of the area.

PARTIAL ANALYSIS:

Concentrate from River Gravel, St. Keverne

	TiO_2	45.12 per cent
Total	Fe.	28.96 per cent

The assay was conducted by F. Hutchin of Tuckingmill and facilities for ore testing were provided through the courtesy of the Camborne School of Mines. Specimens of the beach sand may be obtained from Messrs. Gregory Bottley & Co., of 30, Old Church Street, Chelsea.

British Industries Fair 1952

The strain imposed on the United Kingdom's economy by the rearmament programme and by the need to adapt industrial production to a continually changing pattern of demand in world markets enhance rather than lessen the importance of this year's British Industries Fair, held in London and at Castle Bromwich from May 5 to May 16. Since it is the tasks of the export industries of this country to help in paying for food and raw materials, without which Britain's highly diversified and complex industrial machinery would soon cease to work, the three thousand manufacturers (who will occupy something like a million square feet of space) will spare no effort to make this year's B.I.F. again a "show window" for Britain's products.

General Electric Co. Ltd.

The General Electric Co. Ltd. (Stand C.503/402 Castle Bromwich) will tell the story of its research laboratories, the tools they use, the results they achieve, and their function within the company's large manufacturing organization. For this purpose, the stand will be divided into two parts, the first of which will show the "tools of research" and the second the "products of research."

In the first part of the stand, apart from graphs and illustrations designed to show the size of the Laboratories and their annual expenditure, eight of their main fields of activity—electrical engineering, heating and ventilating engineering, mechanical engineering, illuminating engineering, physics, chemistry, glass technology and metallurgy—will be represented by symbolic devices. Four tools of research used at the laboratories will be shown and their functions illustrated by working exhibits—a spherical integrating photometer, a turbine vibration test set, a vacuum pump system, and a valve vibration life-testing machine.

The Products of Research section of the stand includes a display showing the part played by the G.E.C. research laboratories within the company's organization as a whole. The four actual exhibits which have been chosen are: cold pressure welding, turbine supervisory equipment, microwave circuits, and diamond wire-drawing dies.

B.T.R./Silvertown Group

The B.T.R. Pitmaster brand of conveyor belts recently introduced for underground work is exhibited by the B.T.R./Silvertown Group (Stand D.615, Castle Bromwich). These are no new untried belts, but belts built on traditional principles, the culmination of B.T.R.'s pioneer work in underground conveyor belt manufacture. The brand name B.T.R. "Pitmaster" has been given to the range as a pledge that every possible feature of advantage to underground work is embodied in the belts. For exceptionally heavy colliery work, where there are severe conditions of tension and flexing as well as wear and abrasion, there is the B.T.R. Super Pitmaster. Its great tensile strength and durability, backed by the B.T.R. Tylock splice, are encouraging ever increasing distances between centres on main trunk conveyors and make it a match not only for the 150 h.p. drive heads driving it in British collieries to-day, but for the even more powerful drive heads of 200 h.p. and over, now being developed.

For wet mines, B.T.R. engineers have produced a waterproof belt, which is not merely mildew inhibited, but truly waterproof.

The display includes B.T.R. Long-life belts for ores, wet sand, flint, gravel, granite, etc., and for exceptionally severe conditions of tension and flexing as well as abrasion and pounding-belts for such materials as sharp hard flint and large, heavy jagged granite rocks. One such belt, 24 in. wide on a 450 ft. centres conveyor, is carrying 100 tons an hour of dredged pit sand and another is in its fifteenth year of carrying sharp flint gravel—getting on for the 2,000,000 ton mark.

Jack Olding & Co. Ltd.

Jack Olding & Co., Ltd., Hatfield, Herts (Stand No. 1334, Castle Bromwich), exhibit Britain's first heavy track type tractor—the Vickers VR.180—with its matched equipment. Other new exhibits on show for the first time include The Elstree Heat Planer, and Galion Model 118 Extra Heavy Duty Motor Grader.

Production models of the Vickers VR.180 will be shown equipped with a cable operated Angling Blade Dozer and Cable Control Unit. Another machine will be equipped with a VS.180 Scraper and Cable Control Unit. This tractor (a full description of which appeared in *The Mining Journal*, March 21, 1952), is manufactured by Vickers-Armstrongs, who also produce the ancillary equipment.

Designed by Jack Olding & Co., Ltd., the "Elstree" Heat Planer is a self-contained machine with power transmission and 400 gallon fuel tank, capable of removing bituminous road surfaces and giving greatly improved riding surfaces. In addition it can be used to reshape roads—as, for instance in the reduction of cambers.

Built by Galion (Great Britain) Ltd., the Galion Model 118 Extra Heavy Duty Motor Grader with tandem drive, powered by a Leyland 100 h.p. 6 cylinder Diesel engine, incorporates the most modern features in motor grader design. The carefully balanced power-weight ratio and selected speeds allow it to take full advantage of easy going, whilst making it capable of tackling grading operations under the worst possible conditions. Both Blade and Scarifier are hydraulically controlled—only the touch of a lever is required to produce instantaneous and accurate adjustment. Steering is hydraulically assisted; this, plus the large front wheels—same size as rear—gives the operator easy digging control and, due to the adjustable damper valve, whip on the steering wheel is prevented when an obstacle is encountered. The blade will side reach 44 in., turn through 360° for reverse grading and can be adjusted to 90° from the horizontal for high bank cutting.

The Brush Electrical Engineering Co., Ltd.

Exhibits of The Brush Electrical Engineering Co., Ltd., Loughborough (Stand Nos. C.519 and C.418, Castle Bromwich) will cover turbo-electric generation, transformers, switchgear, alternators and electric motors. The outstanding exhibits will include a 2,500 kW. Brush Ljungström turbo-generating set representing a range of steam turbine generating plant with output from 1,500 to 60,000 kW.; the core and windings of a standard 500 k.V.A. transformer, showing new methods of construction, and Brush metal clad compound-filled switchgear type VC. vertical drawout pattern, breaking capacity ratings up to 250 M.V.A.

The section devoted to Diesel electric locomotives can only be represented by models and the company will display typical models of Brush-Bagnall shunting and main line locomotives. All Brush-Bagnall locomotives are powered by Mirrlees "J" type engines with Brush electrical equipment and can be supplied for any gauge. The range of sizes which can be supplied is from 400 h.p. to 2,000 h.p.

Hale & Hale (Tipton) Ltd.

A new type of pit prop head cast in Blackheart malleable iron, developed at the Tipton, Staffordshire, foundries of Hale & Hale (Tipton) Ltd., will be on show at this firm's Stand (D.609 and 508, Castle Bromwich). Adapted from the Hewitt wedge release, designed for use as an adjustable cutter sprag or collapsible chock release, the new prop head is said to have definite advantages over existing types of adjustable wedge props.

Another Hale product of interest to the mining industry will be a newly developed type of sleeper and clip for light gauge railways, cast in Blackheart malleable.

An important section of the company's foundries is now devoted to making parts for the mining industry and examples on show will include the Hale wedge-type pit prop, the Hale screw-type prop, the Hewitt wedge release and many castings for heavy mining gear, including pipe fittings, tub caps and switchgear.

METALS, MINERALS AND ALLOYS

At this stage it is hard to tell whether the American steel strike has been averted or only postponed. Although collective bargaining has been in progress since the Government seizure of the industry, the parties do not seem to be any nearer an agreement. This is hardly surprising in view of the strong backing which the W.S.B.'s recommendations appear to be receiving from the Government, which must strengthen the unions in their resolve to sit tight and make no concessions. It is difficult to see how the companies are going to get out of the present negotiations without going most of the way to meeting the Union's demands, which would inevitably touch off similar demands from the coal miners, aluminium and other metal workers and set the country well on the road to another bout of inflation. It is equally hard to see the logic behind the Administration's tactics in this matter which it would seem, must inevitably result in defeating their own price and wages stabilization policy.

The one issue upon which it seems definite that the steel companies will not yield is the issue of the legality of the Government's seizure of the industry. As matters stand the Federal Court has rejected their application for a temporary injunction against the Government and it looks as if this issue of principle will eventually find its way to the Supreme Court. Needless to say, the steel masters are by no means alone in this fight and with the United States Chamber of Commerce and the National Association of Manufacturers actively embroiled on the side of the steel masters and the reaction in Congress being overwhelmingly hostile to the President's action, the whole affair promises to provide important election ammunition.

Meanwhile, the industry has picked up quickly from the precautionary slowing down which occurred last week and operations are now back to normal. Even so, the threatened stoppage is estimated to have cost the best part of 1,000,000 tons of steel.

The Defence Materials Procurement Agency is shortly to open a London Office to handle American purchases in Europe, the Middle East and Asia. In charge of the London Office will be General Thomas Wilson, who was a member of the recent United States Tin Commission to Malaya and Indonesia.

COPPER.—The Northern Rhodesian copper-belt is apparently not to have a strike of natives after all. Earlier, Simon Zukas toured the country, so it is alleged, urging the natives to strike against the proposed federation of the two Rhodesias and Nyasaland. When it was proposed to deport him for his action, the natives threatened to strike anyway. When the time came, however, the strike did not materialize and it is thought in London that the present threat has now passed.

The workers at Chuquicamata and Porterillos are still sticking to their decision to strike on April 25.

The National Production Authority has announced an increased flow of copper scrap which has led to a "slight easing" in supplies of copper. This, according to the Authority, "could mark the end of the copper shortage."

Deposits estimated to contain some 100,000 tons of copper in exploitable ore have been discovered north of Elath in the southern Negev. A group of Belgians are reported to be interested in obtaining a concession.

The Copper Institute reports production of refined copper in countries outside the U.S.A. for March at 98,767 s.tons compared with the revised February tonnage of 95,264 s.tons. Production of refined in the States totalled 94,563 s.tons against 85,979 s.tons in February. Stocks outside the U.S.A. show an increase at 163,220 s.tons (154,771) and in the States a slight decrease at 58,447 (59,747).

LEAD.—The Continental lead price at around £140 per ton remained substantially below the official U.K. selling price. The price of Mexican lead continues to sag and at the end of last week was being quoted at 18.08c. per lb., f.o.b. Monterey.

About 400 tons of German lead are reported to be available at 18¼c. delivered New York, April-May shipment.

Although the U.S. Government is willing to buy all surplus lead for the stockpile, purchases are being delayed because the necessary funds have not been made available.

Yugoslav reports indicate that extraction started at the beginning of the month at a new lead and zinc mine at Kosovo-Ajvalija. A cable conveyor system with a capacity of 30 tons an hour links the mine with the railway. A new flotation plant started operations early this month at the Novo Brdo lead and zinc mines; this plant will avoid the necessity of sending ore to a processing plant about 50 miles away.

The 1951 report of American Smelting and Refining states that the examination of the Southern Nigerian lead-zinc properties of Mines Development Syndicate (West Africa) have given "moderately encouraging results." The Nigerian Legislature has given its approval to the lease terms.

TIN.—No progress can now be made in the negotiations for a new tin agreement between the U.S. and Bolivia. The U.S. were showing a noticeable lack of enthusiasm in coming to a settlement before the revolt. Now, talks will have to wait until the new regime has been recognized by Washington. A full discussion of the effects of the revolt will be found on page 389.

According to *Foreign Trade*, published by the Canadian Trade Department, Canada increased her purchases of tin from Malaya last year by over 87 per cent. Her imports totalled 4,025 tons or about 7 per cent of Malayan production.

Due to the Easter holidays, no report appears this week from Our Metal Exchange Correspondent. However, the tin prices and turnover for the four days April 10, 15, 16 and 17, are given in their usual form below.

On Thursday, the official close on the tin market was: Settlement price £960 10s.; Cash Buyers £960; Sellers £960 10s. Three months' Buyers £962 10s.; Sellers £963. In the afternoon the market was steady. Turnover for the day was 110 tons. Approximate turnover for the above four days was 335 tons.

The Eastern price on Thursday morning was equivalent to £970 5s. c.i.f. Europe.

ZINC.—The expanding production of slab zinc in the U.S. is being accompanied by a like advance in consumption. During March, 85,028 s.tons of slab zinc were produced, the largest total for many months; the average monthly output in 1951 was 77,653 s.tons. Domestic shipments mounted to 80,121 s.tons, as compared with the 1951 monthly average of 69,733 s.tons. Exports in March increased to 5,051 s.tons, against the monthly average for 1951 of 3,506 s.tons. The amount sent to the Government stockpile dwindled to 403 s.tons; this is about one-eighth of the monthly average of 3,329 s.tons for 1951. As a consequence of increases in production and consumption keeping roughly in step, the tonnage held in stocks at the end of the month was only slightly different from those of the previous month. The end-March figure was 26,004 s.tons, against 26,551 s.tons at the end of February. The tonnage of unfilled orders at the end of March, 66,620 s.tons, was less than the 70,442 s.tons of end-February. This decrease in unfilled orders indicates that special factors were operating to force the end-February figures to an abnormally high level.

As in the case of lead the Continental zinc price is considerably below the official U.K. price. On the Continent g.o.b. zinc is selling at, or below, £160 per ton compared with the Ministry price of £190.

The price of prime western zinc f.a.s. Gulf dropped last week to 19½c. from 20-21c. a week earlier.

U.S. zinc producers have been pressing for a discontinuation of the present controls on zinc consumption and point to an estimated surplus new and secondary zinc production in the States of some 35,000 s.tons over a consumption forecast of 933,000 s.tons.

ALUMINIUM.—Yugoslav exports of bauxite to Italy and Western Germany will benefit, according to reports coming via Vienna, by the opening of two new works in Bosnia. One is near Stolac and the other near Bosanka; the capacity of the two plants together is rated at 50,000 tons.

Canadian interests are to take a hand in developing the Japanese aluminium industry. Aluminium Ltd. is to acquire 50 per cent of the shares of the Nippon Light Metal Trading Co. for a price, according to reports from Tokyo, of $C.2,000,000, and in addition is to lend the Japanese company $C.1,800,000 on a long-term basis.

It is planned at present to use Aluminium's bauxite concession in India and the mining rights in Malaya for enlarging raw material sources for the Japanese industry. Development of Japanese hydro-electric power resources could bring Japanese prices down to the international level. The reports do not state how long these proposals will take to put into practice; but they do suggest that they will result in a large increase in aluminium consumption in the Far East.

The U.S. output of primary aluminium in February was roughly at the same daily rate as in January, when the output was at its highest since April, 1944. Because of the shorter month, the total output for February of 72,330 s.tons was about 6 per cent lower than the January total of 76,934 s.tons.

The U.S. Government has not yet given up hopes that a "third round" of aluminium expansion will take place. When the proposal was originally mooted, opposition was encountered from both domestic aluminium producers and from independent manufacturers. The Government is now casting around for allies among responsible American business interests.

ASBESTOS.—*Asbestos* of Philadelphia reports that the demand for asbestos fibre remains high in all grades, but the demand is greatest for the shorter fibres. A continuation of capacity production of asbestos textiles is expected, and there are indications that there will be little relief for buyers other than the Government. An improvement in motor production in the U.S. is expected to increase demand for asbestos millboard in the second quarter of the year. The demand for asbestos cement pipes has slackened because cast iron pipes are more easily available.

MANGANESE.—Exports of manganese ore from the Fijian Islands Viti Levu are being increased so rapidly that in January last they totalled more than double those of the whole of last year. January exports are put at 1,300 tons, against the 1951 figure of 631 tons.

By the end of the year, the production of manganese in the U.S. will be almost 50 per cent bigger than in 1951, because of a contract just signed by D.M.P.A., and Westmoreland Manganese Corporation of Arkansas. D.M.P.A. is to advance $3,807,250 against production for plant expansion; the plant will later produce about 52,800 tons per annum against the 120,000 tons produced in the whole of the U.S. in 1944.

MOLYBDENUM.—Molybdenum concentrates production in the U.S. totalled 38,902,400 lb. against 28,480,000 lb. in 1950. Domestic consumption is estimated by the U.S. Bureau of Mines at 33,691,400 lb. an increase of some 7,500,000 lb. over the previous year.

URANIUM.—The recent report on the discovery of important deposits in uranium in New Zealand's South Island (see this column, last week) has been contradicted, by implication, by an official statement by the Government. The statement says that uranium deposits in Westland, South Island, have been found to be too low-grade to yield useful quantities of metal at an economic cost.

WOLFRAM.—Officials of the Emerald mine near British Columbia claim that the mine is now the world's largest producer of tungsten. By an addition to the mill, which has now been completed, the output has been stepped up from 250 tons per day to between 600 and 700 tons daily.

U.S. production of 60 per cent WO_3 last year totalled 6,167 s. tons against 4,244 s.tons in 1950.

Iron and Steel

The iron and steel market was resumed after the Easter holidays in a much more cheerful mood. American mills had begun to close down and furnace fires were being damped when the strike was called off which would have had disastrous consequences for this country as well as the U.S.A. Producing nearly 3,000,000 tons of steel per day, U.S. producers are well able to assist the British steel industry to the extent of 1,000,000 tons or even more if required. Supplies are also coming in from Germany, France, Belgium, Luxembourg and not insubstantial tonnages from Japan. These promise to materially relieve the difficulties of those consumers of steel who are not accorded a high priority. No definite promises have been made, but an acceleration of imports, linked as it is with a restriction of exports, must have a tendency to narrow the gap between supply and demand for steel in the home market.

Possibly the oppressions of the steel allocation system have been exaggerated. At all events, most of the big consumers seem to be managing tolerably well on their allowances. Alloy steel presents a much more serious problem. A serious scarcity of nickel and molybdenum, the principal alloying elements, is foreseen for a long time ahead and in conjunction with the alloy steel makers and the main consumers, the Ministry of Supply has now worked out a scheme for increasing alloy steel production and economizing in its use. It will be an enforced economy; users will require special authorizations and the new regulations will come into force on June 2.

During the Easter holidays there was little interruption of iron and steel production. Stoppages were more frequent at the consuming works. Thus the supply position has not suffered further deterioration and promises early improvement. One of the brightest developments on the home front are the active preparations in hand for lighting up three new blast furnaces on the North East Coast. More pig iron is now seen to be the paramount need of the steel industry and it is a fortunate circumstance that these new stacks should be available for operation before Whitsuntide. Of course they will need more coke, but that will be seen to, and, in fact, at the Cargo Fleet works, 14 new ovens have been built alongside the new blast furnace. Elsewhere additional coking capacity is being built and the production of an extra 1,000,000 tons of pig iron this year, to offset the shrinkage in the supply of scrap is regarded as well within the capacity of the iron works.

APRIL 17 PRICES

COPPER

Electrolytic	£231 0 0 d/d

TIN

(See our London Metal Exchange report for Wednesdays prices)

LEAD

Soft foreign, duty paid	£163 0 0 d/d
Soft empire, including secondary lead ...	£163 0 0 d/d
English lead	£164 10 0 d/d

ZINC

G.O.B. spelter, foreign, duty paid ...	£190 0 0 d/d
G.O.B. spelter, domestic...	£190 0 0 d/d
Electrolytic and refined zinc	£194 0 0 d/d

ANTIMONY

English (99%) delivered, 10 cwt. and over	£340 per ton
Crude (70%)	£275 per ton
Ore (60% basis)	40s./42s. 6d. nom. per unit, c.i.f.

NICKEL

99.5% (home trade)	£454 per ton

OTHER METALS

Aluminium, £154 per ton.	Palladium, £8 10s. oz.
Bismuth, 25s. lb.	Platinum (scrap), £33.
Cadmium, 18s. 3d. lb.	Platinum, £27/33 5s. nom.
Chromium, 6s. 5d. lb.	Rhodium, £45 oz.
Cobalt, 20s. lb.	Ruthenium, £30 oz.
Gold, 248s. f.oz.	Quicksilver, £73/£73.10s. ex-warehouse.
Iridium, £65 oz. nom.	Selenium, 25s. nom. per lb.
Magnesium, 2s. 10½d. lb.	Silver (bar), 77d. f.oz. spot and forward.
Osmiridium, £35 oz. nom.	Tellurium, 19s. lb.
Osmium, £70 oz. nom.	

ORES, ALLOYS, ETC.

Bismuth	65% 11s. 6d. lb. c.i.f. 60% 11s. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (lumpy)	£13 per ton c.i.f.
,, ,, (concentrates)	£13 per ton c.i.f.
,, ,, Refractory	£12 12s. per ton c.i.f.
Baluchistan Metallurgical ...	£14 16s. per ton c.i.f.
Magnesite, ground calcined ...	£26 - £27 d/d
Magnesite, Raw	£10 - £11 d/d
Molybdenite (85% basis) ...	103s. 1½d. per unit c.i.f.
Wolfram (65%), U.K. ...	485s. nom. c.i.f.
Tungsten Metal Powder (for steel manufacture) ...	35s. nom. per lb. (home)
Ferro-tungsten	33s. nom. per lb. (home)
Carbide, 4-cwt. lots	£30 3s. 9d. d/d per ton
Ferro-manganese, home ...	£43 15s. 2d. per ton
Brass Wire	2s. 8½d. per lb. basis.
Brass Tubes, solid drawn ...	2s. 1½d. per lb. basis.

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

The period under review covers the Easter holidays and consequently only three working days are involved. The recent firmer tendency in gilt-edged securities continued, encouraged by the further strength of the £ abroad. Some brokers, however, are disposed to be cautious over the future. Several large scale borrowing operations are pending and it is thought that these may begin now that much of the post budget fall has been regained. Another factor enjoining caution is that the balance of payments situation is still far from resolved. While imports and government expenditure are being in some measure curtailed, the export trade in consumer goods shows signs of running into heavy weather, and this may to some extent offset the better results anticipated.

Tin shares had a better week. While there were no startling improvements, there was a firmer tendency all round and recent reports from Malaya have inspired confidence. There were also hopes of better trading conditions with the United States, but nothing definite has yet been achieved. During the week, the three-day revolution in Bolivia ended in victory for the insurgents. The new President has returned from exile and has announced that his government will endeavour to nationalize tin mines owned by large foreign interests. It is not known how the Bolivian Government proposes to carry this out.

Lead/zinc shares were firmer. The Rhodesian Broken Hill dividend pleased the market. The company declared a final of 3s. 3d. a share, making 4s. 6d., or 90 per cent for the year. This compares with 45 per cent for 1950. The current dividend is of course subject to full deduction of tax for U.K. holders, but is nevertheless highly satisfactory. The net profit is up at £3,609,436 against £1,753,736. Most Barriers improved in sympathy. The West African Mines Development Syndicate announced that its lease terms for the working of the Southern Nigerian property have now been approved by the Colonial government and American Smelting and Refining are reported to be preparing long term plans for the development of the new field. The latest report states that exploration has produced "moderately encouraging results."

Copper shares started the week badly on reports that a strike of native labour was pending over the deportation of Simon Zukas, a foreign labour organizer. Later it was announced that the strike had been called off. Zukas had been urging opposition to the federation of Southern Rhodesia and Nyasaland. The interim dividends of Rhokana and Rhodesian Anglo American disappointed the market and the shares fell away. Rhokana declared an interim of 50 per cent, the same as last year. This time it will of course be subject to the full rate of U.K. taxation for British resident holders. Rhodesian Anglo American declared an interim of 12½ per cent against 10 per cent last year; this again will be subject to normal tax.

Base metal shares finished the week much steadier and it seems probable that the falls are now beginning to discount the uncertain position of such metals as lead and zinc.

Kaffirs, while still upset by politics, fell away. The Union Corporation figures were, however, well received and the shares hardened against the general trend. Crown Mines fell heavily on the bearish report. They, and many of the older low grade producers, are likely to be affected by increasing costs and lower premium sales. Unless this trend can be reversed the outlook for some of these mines is most uncertain. The recent sharp increase in the price of iron and steel products in South Africa is likely to make a difference of between £500,000 and £700,000 to gold mining costs and this naturally had a further unsettling effect.

The excellent diamond sales figures for the first quarter of the current year encouraged shares in this section, but Casts, the leading industrial stone producers, failed to respond satisfactorily.

FINANCE	Price Apr. 16	+ or − on week
African & European	2½	−⅛
Anglo American Corpn.	6⅜	−⅛
Anglo-French	20/3	−1¼d
Anglo Transvaal Consol.	32/6	.....
Camp Bird	11/1½	.....
Central Mining (£1 shrs.)	35/-	.....
Consolidated Goldfields	48/1½	−7½d
Consol. Mines Selection	27/6	.....
East Rand Consols	3/1½	−1½d
General Mining	4⅜	−⅛
H.E. Prop.	32/6	−1/3
Henderson's Transvaal	11/3	−6d
Johnnies	3⅜	.....
Rand Mines	4⅜	−⅛
Rand Selection	38/-	−9d
Union Corporation	8⅛	+⅛
Vereeniging Estates	85/-	−1/3
Writs	30/6	−9d
West Wits	42/6	−1/3
RAND GOLD		
Blyvoors	41/6	−6d
Brakpan	18/3	−1/-
City Deep	36/10½	−1/10½
Consol. Main Reef	35/-	−1/3
Crown	51/10½	−6/10½
Daggas	3⅛	−⅛
Dominion Reefs	2/-	.....
Doornfontein	23/6	−1/-
Durban Deep	3⅛	−⅛
E. Daggas	20/6	−9d
E. Geduld ... (4/- units)	44/6	−6d
E. Rand Props.	73/6	−10½d
Geduld	6¼	−⅛
Grootvlei	34/-	−9d
Libanon	13/-	−9d
Luipaards Vlei	18/3	−6d
Marievale	21/3	−9d
Modderfontein B.	5/6	−1½d
Modderfontein East	28/9	.....
New Kleinfontein	31/6	−4½
New Pioneer	12/9	−6½d
Randfontein	19/9	−3d
Robinson Deep	13/-	.....
Rose Deep	28/9	−1/3
Simmer & Jack	6/4½	−1½d
Springs	7/10½	−4½d
Sub Nigel	50/-	−1/3
Van Dyk	12/-	−3d
Venterspost	20/6	−1½d
Vlakfontein	17/10½	−7½d
Vogelstruisbult	25/9	−9d
West Driefontein	6⅜	−⅛
W. Rand Consolidated	48/9	−1/3
Western Reefs	41/3	−7½d
O.F.S		
Alpha F.S.A.	6/-	−3d
Blinkpoort	17/6	−7½d
Central Mining F.S.	3/6	−3d
Freddies	7/1½	−1½d
Freddies N.	6/3	−3d
Freddies S.	7/6	−3d
F.S. Geduld	2⅜	−⅛
Geoffries	17/9	−7½d
Harmony	18/9	−3d
Lydenburg Estates	10/-	.....
Middle Wits	15/6	−9d
Ofsits	38/-	−1/4½
President Brand	14/6	−1/-
President Steyn	12/6	−1/-
St. Helena	17/7½	−4½d
U.F.S.C. & G.	6/6	−6d
Virginia Deb.	73	.....
Virginia Ord.	9/9	−3d
Welkom	29/6	−6d
Western Holdings (New)	3⅛	−⅛
WEST AFRICAN GOLD		
Amalgamated Banket	1/6	.....
Ariston	5/7½xd	.....
Ashanti	19/9	.....
Bibiani	7/-xd	.....
Bremang	2/7½	.....
G.C. Main Reef	3/4½	+1½d
G.C. Selection Trust	6/4½	+1½d
Konongo	2/9	.....
Kwahu	4/3	.....
London & African Mng.	1/7½	+1½d
Lyndhurst Deep	1/3	.....
Marlu	1/7½	.....
Nanwa	5d	.....
Taquah & Abosso	4/3	+3d
AUSTRALIAN GOLD		
Boulder Perseverance	2/3	+1½d
Gold Mines of Kalgoorlie	9/9	+6d
Great Boulder Prop.	5/3xd	−3d
Great Western Consol.	6/10½	.....
Lake View and Star	16/-	+3d
Mount Morgan	13/9	−2/-
North Kalgurli	12/9	−3d
Paringa	6d	.....
Sons of Gwalia	9/9	.....
South Kalgurli	8/4½	.....
Western Mining	7/3	.....
Wiluna	5/7½	.....
MISCELLANEOUS GOLD		
Cam and Motor	36/3	.....
Champion Reef	7/6	+3d
Falcon Mines	8/-	+3d
Globe & Phoenix	24/9	+3d

MISCELLANEOUS GOLD (contd.)	Price Apr. 16	+ or − on week
G.F. Rhodesian	6/3	−4½d
London & Rhodesian	4/10½	−1½d
Motapa	1/9	−3d
Mysore	4/6	.....
New Guinea	1/3	.....
Nundydroog	5/9	.....
Ooregum	3/-	+3d
Oroville	11/-	−3d
St. John d'El Rey	31/3	.....
Zams	37/3	−1/6
DIAMONDS		
Anglo American Inv.	4½	.....
Casts	31/9	+3d
Cons. Diam. of S.W.A.	4½	.....
De Beers Defd. Bearer	64/9xd	−5/9
De Beers Pfd. Bearer	15½	+⅛
COPPER		
Chartered	60/6	.....
Indian Copper	3/6	.....
Messina	4⅜	.....
Nchanga	6⅜	−⅛
Rhod. Anglo-American	55/6	−2/3
Rhodesian Selection	16/3	−9d
Rhokana	19⅛	−1
Rio Tinto	21	−1
Roan Antelope	12/3	.....
Selection Trust	37/6	+3d
Taaks	56/9	−od
Tharsis Sulphur Br.	43/9	−1/3
TIN (Eastern)		
Anglo-Burma	3/-	.....
Ayer Hitam	25/7½	+1½d
Bangrin	9/6	+4½d
Gopeng	12/9	+6d
Hongkong	8/6	−9d
Ipoh	23/-	.....
Kamunting	11/-	+1½d
Kepong Dredging	6/10½	+1½d
Kinta Tin Mines	14/6	.....
Kramat Pulai	4/10½	.....
Malayan Dredging	21/9xd	+1½d
Pahang	15/6xd	+4½d
Pengkalen	9/9	+4½d
Petaling	15/4½	+1½d
Rambutan	13/9	.....
Siamese Tin	21/9	+6d
Southern Kinta	14/10½	+3d
S. Malayan	24/7½xd	+7½d
S. Tronoh	17/-	+3d
Sungei Kinta	18/1½	+6d
Tekka Taiping	9/3	+3d
Tronoh	25/3	+3d

TIN (Nigerian and Miscellaneous)	Price Apr. 16	+ or − on week
Amalgamated Tin	9/3	+3d
Beralt Tin	22/9	+6d
Bisichi	3/9	−1½d
British Tin Inv.	16/4½	+10½d
Ex-Lands Nigeria	5/3	+4½d
Geevor Tin	11/3	+3d
Gold & Base Metal	4/-	+3d
Jantar Nigeria	4/10½	−4½d
Jos Tin Area	11/-	.....
Kaduna Prospectors	4/3	.....
Kaduna Syndicate	5/3	−1½d
London Tin	5/7½	+4½d
Ribon Valley	1/1½	+1½d
United Tin	2/6	.....
SILVER, LEAD, ZINC		
Broken Hill South	44/3	+6d
Burma Mines (3/6 sh.)	2/-	+3d
Consol. Zinc	24/9	+4½d
Lake George	17/3	+4½d
Mount Isa	35/6	+9d
New Broken Hill	24/3	+3d
North Broken Hill	58/9	−3d
Rhodesian Broken Hill	17/3xd	−1½d
San Francisco Mines	33/9	−3d
Trepca	3/6	.....
MISCELLANEOUS BASE METALS & COALS		
Amal. Collieries of S.A.	47/6	.....
Associated Manganese	43/-	−9d
Chinese Engineering	3/10½	+1½d
C.P. Manganese	50/6	+9/-
Natal Navigation	3⅜	.....
Wankie	16/6	−6d
Witbank Colliery	2⅜	.....
CANADIAN MINES		
Dome	$34½	.....
Hudson Bay Mining	$100	.....
International Nickel	$78½	.....
Mining Corpn. of Canada	£5⅛	−£⅛
Noranda	$141½	−$½
Quemont	£8½	.....
OIL		
Anglo-Iranian	6	+⅛
Apex	43/9	−1/3
Attock	23/3	+1½d
Burmah	63/9	+7½d
Canadian Eagle Bearer	32/-	−3d
Mexican Eagle	22/1½	.....
Shell	4⅜	−⅛
Trinidad Leasehold	30/6	−6d
T.P.D.	28/9	−7½d
Ultramar	32/3	−2/1½

COMPANY NEWS AND VIEWS

Union Corporation's Wide Horizon

As usual the Union Corporation's annual report and accounts constitute something more than a recital of the group's activities during the year. The report just published again gives the usual table of gold production which contains what is probably as authoritative an estimate as any of last year's production, country by country, with comparative figures back to 1945, together with an equally interesting table of estimated world stocks of monetary gold, again broken down by country and covering the same years. For those who still rely on a study of economic history for their assessment of future business trends, the Union Corporation's widely-known trade cycle chart, going back to the French Revolution, will have its usual fascination.

Apart from this revue of the wider horizon, shareholders will doubtless welcome this year's report for the improved results and increased dividend that it announces. Earnings for the year to December 31 last were nearly 50 per cent up at £2,135,714, but the greater part of this increase was absorbed by taxation provision which showed an increase of some £600,000 at £1,153,000. Profits after tax amounted to £982,714 compared with £927,319. Of this sum £300,000 was again transferred to exploration reserve while the year's dividends, totalling 6s. 6d. per share free of U.K. tax, required £604,500 and compares with a distribution of 6s. for 1950. After providing £47,000 for Staff Pension Fund contingencies, the balance carried forward showed an increase of about £30,000 over the previous year at £313,541.

The Corporation's report gives a useful summary of the South African gold mining industry's performance during 1951, as a background to the Corporation's own group of mines, from which the following interesting comparisons emerge:

	Union Corporation Mines	*All Far East Rand Mines*	*Whole Industry*
Yield per ton.....	4.36 dwt.	3.81 dwt.	3.76 dwt.
Value of yield per ton	54s. 2d.	47s. 6d.	46s. 11d.
Working costs per ton	28s. 11d.	30s. 1d.	31s. 10d.
Working costs per f.oz.	132s. 10d.	158s. 0d.	169s. 6d.

The results for the group's individual Rand producers for 1951 have already been reviewed in this column (March 28), but their aggregate results, now published in the Corporation's own report are of interest. Tonnage milled during the year showed an increase of some 60,000 tons at 7,268,500 tons. Yield per ton was, however, fractionally lower and gold output for the year actually declined by nearly 7,000 oz. at 1,589,165 oz. Working profit was up by nearly £35,000 at £10,406,150, although dividends were down by about £220,000 at £5,193,204, while taxation was up by over £340,000 by £5,340,845.

In the Orange Free State, Union Corporation had the distinction of bringing the first gold mine to the production stage. St. Helena Gold Mines has every right to this distinction as throughout the exploratory and development stages the mine has been one of the very earliest in the field and the experience gained in overcoming the lack of essential services in the early stages and, more recently, in overcoming the water trouble encountered in shaft sinking has been of considerable assistance to those mines following behind.

The Corporation is also interested in Stilfontein Gold Mining Company, in the Klerksdorp area and Western Holdings in the O.F.S., both of which are expected to be in production this year, while substantial benefits have accrued from the recent high prices for base metals by virtue of holdings in Selection Trust, the Tsumeb Corporation, San Francisco Mines of Mexico and the Chrome Mines of South Africa.

Exploration of outlying territories, which it carries out through wholly owned subsidiaries, has always formed an interesting part of the group's activities and during the past year exploration was continued, notably by Capital Mining Areas in the Bethal district of the Transvaal and by Central Mining Exploration in the Mlala area in Tanganyika.

Géomines Big Expansion Approved

On Thursday of last week the proposal of the Géomines Company to enlarge its capital from Frs.B.200 million to Frs.B.700 million, some particulars of which were given in *The Mining Journal* of March 28 last, were submitted by the chairman of the company, M. Léon Greiner (who is also the General Manager of the Cockerill Works at Seraing) to a meeting of shareholders, and the Directors' proposals were unanimously adopted, writes our Belgian Correspondent.

The issue will be guaranteed by the Banque de la Sté. Générale and Messrs. Nagelmackers, the old banking house of Liège and Brussels, who were among the founders of the Géomines Company.

In order to increase the production of cassiterite with its by-products of tantalum and niobium the company has decided to bring in 15,000/35,000 h.p. from its Piana-Mwanga hydro-electric station on the Luvua, a tributary of the Lualaba (Upper Congo). Géomines has already built a series of crushing plants and a big concentrator which were put into commission in the last few months. Operations at these plants have satisfied the company of the possibility of working the discovery and of thin sheet to process the ores.

In describing the situation of the Manono-Kitotole field, in which the new deposits occur, it may be mentioned that Manono is situated between the Lualaba and its tributary the Luvua and is connected by a 50 km. light railway with Muyumba on the navigable Lualaba, a port of call for the Upper Congo Great Lakes railway steamers between Bukama which is situated at the junction of the Lualaba and the Cape Town Railway, and Kabalo terminus of the lake and railway service as well as of the Kindu-Kongolo and Kongolo-Albertville lines. Albertville is the chief Congo port of Lake Tanganyika.

Crown Mines Dyke Intrusion

A larger footage of work was done last year on Crown Mines, which is now virtually the doyen of the Rand, and more reef was sampled, giving a better value, although the pay ratio was slightly down. Milling operations were disappointing and the mine suffered from insufficient labour. There was a decrease of 133,000 tons to 3,242,000 in the ore crushed, yield was also lower at 3.411 dwt. and revenue dropped 9d. per ton to 44s. 7d. This, coupled with a rise of 3s. 1d. per ton in costs to 35s. 10d. resulted in the working profit per ton milled being only 8s. 9d. against 12s. 7d. the previous year. Total profit showed a drop of no less than £695,728 to £1,421,464, which necessitated the dividend being reduced from 12s. to 10s. per share.

More development was done than for many years—113,426 ft. and of the 61,445 ft. sampled, 48.7 per cent proved payable, value being 15.3 dwt. over 16 in. Although most of the ore mined came from the Main Reef Leader, four other reefs supplied varying quantities, but ore reserves were not maintained and at 9,044,000 of 4.3 dwt. they show a drop of 168,000 tons. There is an additional 4,654,000 tons in pillars.

During recent years, as the Consulting Engineer points out, there has been a steady decline in both the value and percentage of payability of the Main Reef Leader, with increasing depth. Continuance of this trend and poor grade of ore developed in the bottom levels, coupled with rising costs, gives cause for anxiety as to the economic prospects of the undeveloped areas at greater depth. Another adverse factor is the dyke intrusion encountered at about 9,500 ft. below surface in the south-eastern portion of the mine. Values beyond the dyke have so far proved discouraging but exploratory work is still proceeding. Unless there is a favourable change, the heavy expenditure necessary to open up the area south of the dyke would not appear to be justified in the light of current economic conditions.

Depth Development at East Rand Prop

The programme for extending the East Rand Proprietary Mines in depth, embarked upon in 1949, made good progress last year. Work in connection with the Vertical, sub-vertical and sub-incline shafts, which is part of the scheme, made good

progress. Reef developments in the lower levels and winzes, disclosed very encouraging values which have exceeded the expectations on which the programme was based.

The tonnage milled during the year of 2,624,000 was 29,000 tons below that of the previous year but gold recovered was higher as also the yield—4.094 dwt. Revenue per ton increased by 2s. 8d. to 53s. 6d., but the benefit was countered by a rise of 2s. 11d. in costs to 34s. 11d. This resulted in the profit per ton milled being down by 3d. to 18s. 7d. and the aggregate working profit by £64,736 to £2,438,080. The same dividend of 5s. per share was, however paid. Taxation was similar to that for the previous year—£869,775 and funds transferred to Capital Expenditure amounted to £500,000. It is estimated that an amount of £925,000 will have to be spent on this account during the current year mainly for shaft sinking, etc., electric power and cooling plant.

Although slightly less development was done—52,882 against 54,340 ft.—the proportion sampled—16,190 ft.—gave better results, with a pay percentage of 67.8 (against 50.4) and a value of 11.2 dwt. (7.3 dwt.) over 41 in. Development exposures in the east on Main Reef Leader and in the west on Main Reef and South Reef were satisfactory and values in the pilot winze below the 58th level horizon were above the average of the mine. A higher proportion of reef development was located in the high grade central area. Ore reserves now stand at 6,943,000 tons (7,055,000); they have been up-graded from 4.8 to 5.1 dwt.

Progress of Rose Deep

Steady progress has been made with the programme for the modification and improvement of facilities both underground and on the surface of Rose Deep. The quantity of ore remaining to be mined is definitely very substantial and prospects look, on the whole encouraging. The 1951 annual report, in confirming this view, mentions that the benefits derived from the sounder technical position of the mine, are being absorbed by rising costs. This is reacting not only on milling results but also on pay limit of ore being mined and rendering development work less productive; erstwhile affecting the payable ore which it is possible to block out for reserves.

A lower tonnage was dealt with last year—993,000 against 1,017,000 tons, but the yield was slightly higher—2.82 dwt. against 2.71 dwt. Revenue per ton rose by 2s. 8d. to 36s. 11d., but most of this benefit was absorbed by the increase of 2s. 4d. per ton in costs to 30s. 3d., with the result that working profit was only 4d. per ton better at 6s. 8d. The total aggregate profit was £5,433 more at £329,141, but the dividend was lowered from 7s. to 5s. 3d. A bigger amount was called for in taxation, £117,933 compared with £92,131.

The shortage of non-European labour was felt in connection with both surface work and underground development. The footage accomplished dropped to 39,519 (against 44,418) ft., and of the 27,990 ft. sampled, 36.4 per cent proved payable against 40.2 per cent the previous year. Value was 5.6 dwt. over 54 in. Ore reserves have decreased from 2,752,000 tons of 3.5 dwt. to 2,416,000 tons of 3.6 dwt. The Consulting Engineer points out that encouraging values continue to be disclosed in the dewatered areas of the Clement and Knights Central sections.

Durban Deep and the Kimberley Reef

When all the capital work now in progress at Durban Deep is completed, there will be little to worry about concerning the mine's layout and ventilation. The 1951 annual report of this Central Mining-Rand Mines producer gives emphasis to the progress being made and states that surface arrangements for handling the ore from the new No. 8 shaft Kimberley Reef are nearly complete, and it is estimated that by the middle of the current year the tonnage milled from this Reef will be over 20,000 tons per month. The importance of this to the mine's future has been previously indicated and as seen from the available reserves, the Kimberley reef contributes about 11 per cent to the total.

The tonnage of ore dealt with last year of 2,150,000 was the highest for a decade. Yield of 3.442 dwt. went against 3.457 dwt. Revenue per ton rose by 1s. 3d. to 45s., but the benefit was absorbed in working costs, which increased by a similar amount to 31s. 9d. However the working profit was slightly higher at £1,428,684 against £1,409,622. Taxation called for a larger amount, £456,801, as likewise capital expenditure, £234,250. The dividend was reduced from 5s. 9d. to 5s., absorbing £581,250. This was a definitely conservative step and it left a large balance as the accounts show. The financial position is strong but further expenditure is necessary to complete the capital work at the mine.

The total development footage was slightly lower—79,921 ft. against 81,128, and of the 42,230 ft. sampled, 57.8 per cent was payable of 6.8 dwt. over 46 in. The Main reef showed a decreased percentage of payability as also the South Reef. The channel width of the Kimberley Reef dropped from 63 to 50 without, however, substantially affecting the in.-dwt. value, and the percentage payability was slightly higher at 64. Total ore reserves have come down from 10,151,000 to 9,377,000 tons, their value being the same—4.2 dwt.

City Deep's Milling Grade

For the second year running there was a set-back in the grade of ore milled by City Deep during 1951. This naturally influenced the revenue and profit per ton which, with an upward trend in working costs, resulted in a substantial decline in the year's aggregate profit. It is unlikely that there will be any appreciable improvement in the mill grade until the "K" line of incline shafts can be brought into operation, which will probably take about two years. It will be recalled that after the company took over the adjoining Nourse Mines property in 1948, it was decided to develop the western portion of the mine and extend southwards. A new series of sub-incline shafts was decided on, calling for capital expenditure of about £1,500,000. Work in this connection went forward last year satisfactorily, although milling results were not so good.

Tonnage crushed was 1,955,00 (a drop of 7,000 tons); yield of 4.039 dwt. went against 4.269 dwt. the previous year and revenue was 52s. 9d. compared with 54s. The effect of this drop of 1s. 3d. was added to by a rise of 2s. 9d. in costs to 41s. 11d., and working profit of 10s. 10d. per ton went against 14s. 10d. in 1950. Total aggregate profit of £1,056,905 showed a decrease of £398,298 and necessitated the dividend being scaled down from 7s. to 5s. 6d.

Development on the Main Reef, the Leader and South Reef amounted to 54,883 ft., of which 25,155 ft. were sampled, the pay ratio being lower at 32.8 per cent and the value of 14.2 dwt. went against 15.9 dwt. Developments took place, for the most part, in the upper levels of the mine, mostly on the Leader and South Reefs. New ground opened up was less than in the previous year and although an appreciable amount of payable ore from the South Reef was added to reserves, their aggregate tonnage is down; they amount to 6,313,000 tons, value 5.8 dwt. against 6,893,000 tons of similar value.

West Vlakfontein's Boreholes

There appears to be little change in the position of West Vlakfontein and the mine remains on a caretaking basis except for drilling operations. The report for 1951 reflects a debit balance of £10,727, made up of expenditure totalling £13,036 less revenue of £2,309. The net expenditure to December 31, 1951 on this account and shown under the heading of Fixed Assets, amounts to £304,849.

The property is situated on the Far Eastern Rand and adjoins Vlakfontein Gold Mining on that company's south-western boundary. Although in the East Rand Consolidated group, the Consolidated Gold Fields acts as technical advisers. The mine has benefited from the advancement of an underground haulage effected with Vlakfontein, and this latter company has also agreed to keep the mine unwatered and administer operations, which this last year or two have been connected with drilling. This was agreed upon after the suspension of mining work in April, 1950 when it was decided to prospect the western half of the mining area as both the Main Reef and the Kimberley Reef horizon in the Eastern section had given disappointing results. Two holes have been put down. Borehole W.V.3 was advanced last year a distance of 1,056 ft. to a total depth of 6,446 ft., drilling being continued in the Kimberley shales with intrusives occurring at different depths. The other borehole, W.V.4 met with varying strata with occasional grits belonging to the Main Bird Series. It was advanced a distance of 3,371 ft. to a total depth of 7,917 ft. Difficulty was experienced in extracting the rod line and at the end of the year there still remained in the hole approximately 2,600 ft. of rods.

New Klein's Expansion Programme

Situated on the western rim of the group of Far Eastern Rand mines, the New Kleinfontein is in a particularly interesting position. The company is not under the technical control of a South African group but run independently. It is an old undertaking having been registered in 1894 and the property is divided into two areas—the old northern part where payability is low and the second area—the Apex section, adjoining the Brakpan. Devaluation changed the outlook for the mine and a complete revision of its policy followed. A major programme of expansion was decided on with replacements, renovation and development; expenditure of £372,000 was earmarked as necessary to be provided out of mine revenue and the proceeds of a new issue. This latter took place last year and the 1951 Report shows the effect of the increase in capital to £1,735,000 and the issue to shareholders of 249,013 new shares of £1 each at 25s.

No definite indication of the mine's expansion is yet shown and the milling tonnage last year of 1,279,000 compared with 1,326,000 in 1950. Recovery of 2.616 dwt. went against 2.596 dwt. and revenue £2,194,569 compared with £2,173,754. Per ton it was 34s. 3d. against 32s. 9d. but the benefit of this was absorbed by an increase of 1s. 3d. per ton in costs to 25s. 1d. Profit, £589,576, was similar to the previous year, £589,790 and the dividend was maintained at 3s. 6d. per share. Capital expenditure of £161,303 was incurred on a new crusher station, work on tube mills, etc., extension of Glyn shaft and the re-opening of the Van Deep section of the property. Plant extension is expected to come into commission before the end of the current year.

The footage of development last year was 8,539 ft. less at 39,154 ft. and of the 20,645 ft. sampled, 44 per cent proved payable of 4.9 dwt. Available ore reserves declined by 136,000 tons to 2,945,000 tons of 3.3 dwt.

Camp Bird's Liquid Position

The strong financial position which has been built up by Camp Bird Ltd. has enabled it to add to its maintained dividend for 1951 of 1s. a token payment of 3d. by way of a Jubilee bonus. The company has undergone something of a metamorphosis since it started fifty years ago, principally for the purpose of operating the Camp Bird mine in Colorado. That gave a good account of itself for many years but at the end of its working tether on a comprehensive scale, it was let on tribute. Old mines die hard and this belief was recognized by the company when it renewed the tributing agreement in 1950 for five years in the confident belief that the lessees would do everything to expedite development and increase tonnage. This has taken place and the company received last year an amount of £19,492 of the mine profit compared with £13,074 in 1950. This was only one item of income. As a mining-finance company, which Camp Bird now is, it has built up a varied portfolio of investments which, last year, brought it in £159,794 by way of dividends, while realizations and sundry receipts added a further £97,101—a total income of £276,387 compared with £212,653 previously. Taxation called for £100,979 (£69,380) and, after placing £65,000 (same) to investment reserve, profit rose from £63,253 to £93,495.

The company's quoted investments of £1,050,285 have a market value in excess of this. They consist of gold, platinum and base-metal mining undertakings in South Africa, Rhodesia, Australia and Mexico. Shares of companies working on the West Wits line include Blyvoor, Doornfontein and West "Dries"; in the O.F.S. an interest is held in New Consolidated F.S. Exploration, while in the Commonwealth, shares are held in Lake George and Lake View and Star. A holding in Fresnillo gives the company a participation in Mexican mixed metals, while the balance of the portfolio is made up of holdings in South African coal, Rhodesian gold and in industrial and tin shares.

Amalgamated Collieries of S.A. Group Ventures

The big expansion scheme started over three years ago by Amalgamated Collieries of South Africa has gone well ahead; its completion will yet take some time—indeed the increased capacity project is planned up to 1956.

The undertaking's business of coal mining is conducted directly through its operated collieries—Cornelia, near Vereeniging and Schoongezicht, near Witbank; also by its wholly owned subsidiaries—Springfield Collieries and Largo Colliery. The greater part of the output is obtained from the Cornelia and the Springfield collieries and is supplied to the Electricity Supply Commission; they also take some of the Largo's coal, the balance being supplied to Geduld Proprietary. The Schoongezicht pit produces high-grade coal for railway and industrial requirements; it is, however, nearing the end of its useful life and will be replaced by a new colliery in the Eastern Witbank coalfield. The total of sales output during 1951 amounted to 7,093,654 tons against 6,790,748 tons the previous year.

In order to provide the Collieries with necessary funds to proceed with the scheme of enlargement and acquire a substantial interest in a new colliery styled "New Largo Colliery," additional funds up to £650,000 are being acquired from the Vereeniging Estates, which has taken over the option held by African & European Investment.

Amalgamated Collieries accounts for 1951 show the effect of the increase in its capital to £3,000,000, brought about to enable the Vereeniging Estates to exercise option on 330,000 shares. Profit for the year amounted to £521,806 against £474,355. Taxation called for £81,000 (£60,707), and the dividend was maintained at 3s. per share, absorbing £412,500. The unappropriated balance of £144,689 goes against £117,523 the previous year.

Company Shorts

B.S.A. Earns More and Pays More.—The Directors of British South Africa Co. are recommending the payment of a final dividend of 26⅔ per cent making a total distribution for the year ended September 30, 1951, of 40 per cent which compares with a total distribution of 33⅓ per cent in the preceding year. On the company's ordinary shares, a final dividend of 4s. per share is being recommended making a total dividend for the year to September 30, 1951, of 6s. per share which compares with a total payment of 5s. per share in the previous year.

Subject to approval at the annual meeting to be held on May 29, the dividends will be paid on June 6 to all those registered in the company's books on May 2. The net U.K. rate of income tax applicable to the dividend is 5s. 8d. in the £.

The preliminary statement announcing the foregoing recommendations also reports that the profit for the year ended September 30, 1951, was £2,723,209, against £1,460,742.

St. John d'el Rey Mining Co. Ltd. Earns Less, Pays Same.—St. John d'el Rey Mining in a preliminary statement has announced that at the annual meeting to be held on June 12, the directors will recommend the payment of 1s. per £1 stock, free of tax, on the preference stock making 10 per cent net for the year 1951, and the payment of 1s. 6d. per £1 stock, free of tax, on the ordinary stock making 10 per cent net for the year.

Subject to audit, net profit for the calendar year 1951, after charging £70,611 (£80,610) for depreciation and £162,559 (£212,993) for taxation, amounted to £114,232 against £137,722 in the previous year.

The carry forward at the fiscal year end was £53,680 compared with £55,091 brought in.

Harmony Gold: 97 Per Cent of New Issue Subscribed.—Harmony Gold Mining has announced that of the 5,600,000 new 5s. shares offered recently for subscription at 18s. 6d. per share, 97 per cent equivalent to 5,444,361 shares were applied for leaving 159,369 shares to be taken up by the underwriters.

Messina (Transvaal): 92½ per cent of Share Offer Subscribed. The Messina (Transvaal) Development Co. has announced that of the 300,000 shares recently offered to shareholders at £4 per share, approximately 92½ per cent have been taken up.

The Esperanza Copper & Sulphur Co.—Esperanza Copper have announced that development work at Kinousa, mainly the driving of the adit, is proceeding satisfactorily, some 1,194 ft. having been driven leaving some 700 ft. to complete. Operations are continuing in the Limni Section with a view to the production and shipment of some of the high grade sulphur ore disclosed.

The company has also announced that the ore already sold was not crushed and ready for the first shipment until mid-January, owing to the late delivery of certain equipment. This was, however, held up because of exceptionally bad weather but two ships have been chartered to take cargoes of Kinousa ore this month, a third cargo should be shipped very soon after and it is anticipated that regular shipments will now begin from Kinousa and Limni.

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LTD.

(Incorporated in the Union of South Africa)

ORDINARY DIVIDEND No. 31

SHARE WARRANT COUPON No. 33

With reference to the notice of declaration of dividend published in the Press on March 27, 1952, the following information is published for the guidance of holders of Share Warrants to Bearer:

The DIVIDEND on shares represented by SHARE WARRANTS TO BEARER will be PAID on or after May 20, 1952, after surrender of the appropriate coupons at BARCLAYS BANK (DOMINION, COLONIAL & OVERSEAS), Circus Place, London Wall, London, E.C.2, where listing forms may be obtained.

Coupons must be left four clear days for examination and may be presented any day (Saturdays excepted) between the hours of 11 a.m. and 2 p.m.

Coupons may also be presented for payment in French currency at Banque de l'Union Parisienne, 6 & 8, Boulevard Haussman, Paris 9e.

Union of South Africa Non-resident Shareholders' Tax will be deducted at the rate of 6.075 per cent from the dividend payable in respect of all Share Warrant coupons. United Kingdom Income Tax will also be deducted from Coupons presented for payment at Barclays Bank (D.C. & O.), London, unless Coupons are accompanied by Inland Revenue declarations. Where such deduction is made, the net amount of the dividend will be 2s. 7.041d. per share, viz.:—

	Per share s.	d.
Amount of Dividend declared	4	0
Less: South African Non-Resident Shareholders' Tax at 1s. 2.58d. in the £.....		2.916
	3	9.084
Less: United Kingdom Income Tax at 4s. 9d. in the £ on the Gross amount of the dividend of 4s. 11.127d.	1	2.043
Net amount	2	7.041

By Order of the Board,
W. E. GROVES, London Secretary.

London Office:
11, Old Jewry, E.C.2.
April 10, 1952.

NOTE.—The Corporation has been requested by the Commissioners of Inland Revenue to state:—

Under the provisions of Section 348 and the 17th Schedule of the Income Tax Act, 1952, relating to "unilateral relief" from double taxation, South African tax applicable to the dividend is allowable as a credit against the United Kingdom tax payable in respect of the dividend. The deduction of tax at the reduced rate of 4s. 9d. in the £ instead of at the standard rate of 9s. 6d. in the £ represents a **provisional** allowance of credit at the rate of 4s. 9d. in the £. The final rate of credit allowable to a particular shareholder depends on his personal rate of tax; it may be more or less than 4s. 9d. in the £ but must not exceed three-fourths of the personal rate. Revision of the credit involves a corresponding adjustment of the amount shown above as the gross amount of the dividend for United Kingdom tax purposes.

RHODESIAN ANGLO AMERICAN LTD.

DIVIDEND No. 31

The Directors have to-day declared an Interim Dividend in respect of the year to June 30, 1952, of one shilling and threepence (1s. 3d.) per unit of Stock.

Dividend Warrants will be posted on or about May 30, 1952, to members registered at the close of business on April 25, 1952. The Transfer Registers in London and Johannesburg will be closed from April 26, 1952, to May 3, 1952, inclusive.

This dividend declaration is based on payment being made in United Kingdom sterling. Payment to members registered on the Branch Register will be made in the equivalent Union of South Africa currency, provided that if in the opinion of the Directors there is no material difference between the two currencies at the time of payment of the dividend, such members will receive payment at par of exchange.

Dividends payable to addresses in the United Kingdom will be subject to deduction of United Kingdom Income Tax at a rate reduced by a provisional allowance for relief from double taxation. Other dividends will be paid without any deduction of tax.

For and on behalf of

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA LIMITED.

Registrars and Transfer Agents in England

W. E. GROVES,
London Secretary.

11, Old Jewry,
London, E.C.2.
April 9, 1952.

Mining Men

Mr. D. W. Lushell has resigned from Mufulira Copper Mines and has joined the staff of the Britannia Mining & Smelting Co., Ltd., British Columbia, Canada.

Mr. F. E. Fitzgibbon has been appointed assistant mill superintendent, Nchanga Consolidated Copper Mines.

Mr. R. G. Head has been appointed Head of the Mining Department, School of Metalliferous Mining (Cornwall).

Mr. O. McCulloch has joined the staff of Rhodesian & General Asbestos Corporation at their Shabani Mine in Southern Rhodesia.

Mr. R. Walker, managing director of Central Mining & Investment Corporation has been elected a director of Selection Trust.

Major J. West has been appointed a Special Member of the House of Representatives under the new Nigerian constitution.

The Mining Record of Denver, Colorado, has announced that their new address is 2155, Lawrence Street, Denver 2, Colorado.

Lectures on Metallurgical Industry in U.S.A.—Professor Clark B. Carpenter will deliver a series of four lectures on *The Metallurgical Industry in the United States* in the Metallurgy Lecture Theatre, Royal School of Mines, Prince Consort Road, South Kensington, S.W.7.

On April 18: The General Economic & Industrial Conditions that have led to the enormous demand for metals in the United States. The Iron Industry; April 25: The Steel Industry; April 29: The Lead and Zinc Industries; May 1: The Copper and Aluminium Industries.

There will be no charge for admission and the lectures will start at 5 p.m.

WEST RAND CONSOLIDATED MINES, LTD.

(Incorporated in the Union of South Africa)

CAPITAL (Registered & Issued): £2,150,000 in 4,250,000 Ordinary Shares of 10s. each and 25,000 Deferred Shares of £1 each

DIRECTORS:

SIR GEORGE W. ALBU, Bart. (Chairman). C. S. McLEAN. E. L. LLOYD. M. W. RICHARDS.
W. M. FRAMES. ERROLL G. HAY. C. S. GOLDMAN. N. F. H. RAILING. T. W. T. BAINES.

EXTRACT FROM ANNUAL REPORT TO DECEMBER 31, 1951

Tons milled		2,537,000
Yield (3.184 dwt. per ton)		403,893 f.oz.
Working Revenue		£5,261,051
Working Costs		3,281,107
Working Profit		£1,979,944
Additional Revenue		157,199
		£2,137,143
Balance at December 31, 1950		593,120
Total Available Profit		£2,730,263
Appropriated as follows:—		
Government and Provincial Taxes		£800,504
Silicosis Board:		
Further provision against Outstanding Liabilities		33,600
Capital Expenditure appropriated at December 31, 1951		473,213
Ordinary Dividends Nos. 40 and 41, totalling 30 per cent	£637,500	
Deferred Dividends Nos. 31 and 32, totalling £8 10s. 0d. per share	212,500	
		850,000
Balance to Balance Sheet		572,946
		£2,730,263

ORE RESERVE—The fully developed Ore Reserve, as recalculated at December 31, 1951, amounted to 9,729,000 tons, of an average value of 3.5 dwt. over 48 in. (1950: 10,047,000 tons at 3.5 dwt. over 48 in.)

URANIUM PRODUCTION—The construction of the plant for the extraction of uranium from the gold residue slimes of the West Reduction Plant is proceeding satisfactorily and according to plan.

At the Annual General Meeting held in May, 1951, shareholders were advised of the basis on which production of uranium would take place and the benefits which shareholders might anticipate by way of profits resulting from the operation of this plant. Towards the end of 1951 further discussions took place with the Atomic Energy Board and as a result of these discussions the benefits which shareholders might anticipate have been improved. This Company has undertaken to investigate the possibility of expanding production immediately the plant at present under construction is brought into operation.

It is anticipated that the plant will be in production in the second half of 1952 in accordance with the forecast made last year.

Copies of the full Report and Accounts are available at the London Office of the Company, Winchester House, Old Broad Street, London, E.C.2.

CROWN MINES, LIMITED

(Incorporated in the Union of South Africa)

Extracted from the Annual Report for the Year ended 31st December, 1951

Capital—£1,000,000 in 10s. Shares, £943,062 10s. issued, fully paid

Tons Milled.....3,242,000

		Per ton milled
Total Working Revenue	£7,225,638	£2 4 7
Total Working Expenditure	5,804,174	1 15 10
Working Profit	£1,421,464	£0 8 9
Total Profit for the year		£1,450,134
Balance unappropriated at 31st December, 1950		1,160,460
Transfer from Shareholders' Contingency Reserve		44,300
		£2,654,894

This amount has been dealt with as follows:—

Funds transferred for Capital Expenditure	£80,724	
Taxation	419,836	
Forfeited Dividends Account	44,307	
Dividends declared during the year—No. **100** of **5s. 6d.** per share and No. **101** of **4s. 6d.** per share	943,063	
		1,487,930
Leaving a balance unappropriated of		£1,166,964

The **ore reserve** at the 31st December, 1951, was re-estimated as follows:—

Reef	Available			Shaft and Safety Pillars			Total		
	Tons (000s)	Value Dwt.	Width Inches	Tons (000s)	Value Dwt.	Width Inches	Tons (000s)	Value Dwt.	Width Inches
Main Reef	47	3.3	48.5	—	—	—	47	3.3	48.5
Main Reef Leader	7,776	4.5	48.0	3,774	5.9	47.3	11,550	4.9	47.8
South Reef	1,221	3.6	49.0	880	4.4	52.4	2,101	4.0	50.3
Total ...	9,044	4.3	48.1	4,654	5.7	48.2	13,698	4.8	48.2

Compared with the previous year the available reserve decreased by **168,000** tons, the value being **0.2** dwt. lower and the width **0.9** in. higher.

The full Report and Accounts may be obtained from the London Secretaries, A. MOIR & CO., 4, London Wall Buildings, E.C.2.

EAST RAND PROPRIETARY MINES LIMITED

(Incorporated in the Union of South Africa)

Extracted from the Annual Report for the Year ended 31st December, 1951

CAPITAL—£2,000,000 in 10s. Shares, £1,980,000 issued, fully paid

Tons Milled.....2,624,000

		Per ton milled
Total Working Revenue	£7,023,290	£2 13 6
Total Working Expenditure	4,585,210	1 14 11
Working Profit	£2,438,080	£0 18 7
Net Profit for the year		£2,448,244
Balance unappropriated at 31st December, 1950		761,169
Transfer from Shareholders' Contingency Reserve		7,200
		£3,216,613

This amount has been dealt with as follows:—

Funds transferred for Capital Expenditure	£500,000	
Taxation	869,775	
Forfeited Dividends Account	7,172	
Dividends declared during the year—No. **63** of **2s. 6d.** per share and No. **64** of **2s. 6d.** per share	990,000	
		2,366,947
Leaving a balance unappropriated of		£849,666

The **ore reserve** re-estimated at 31st December, 1951, was as follows:

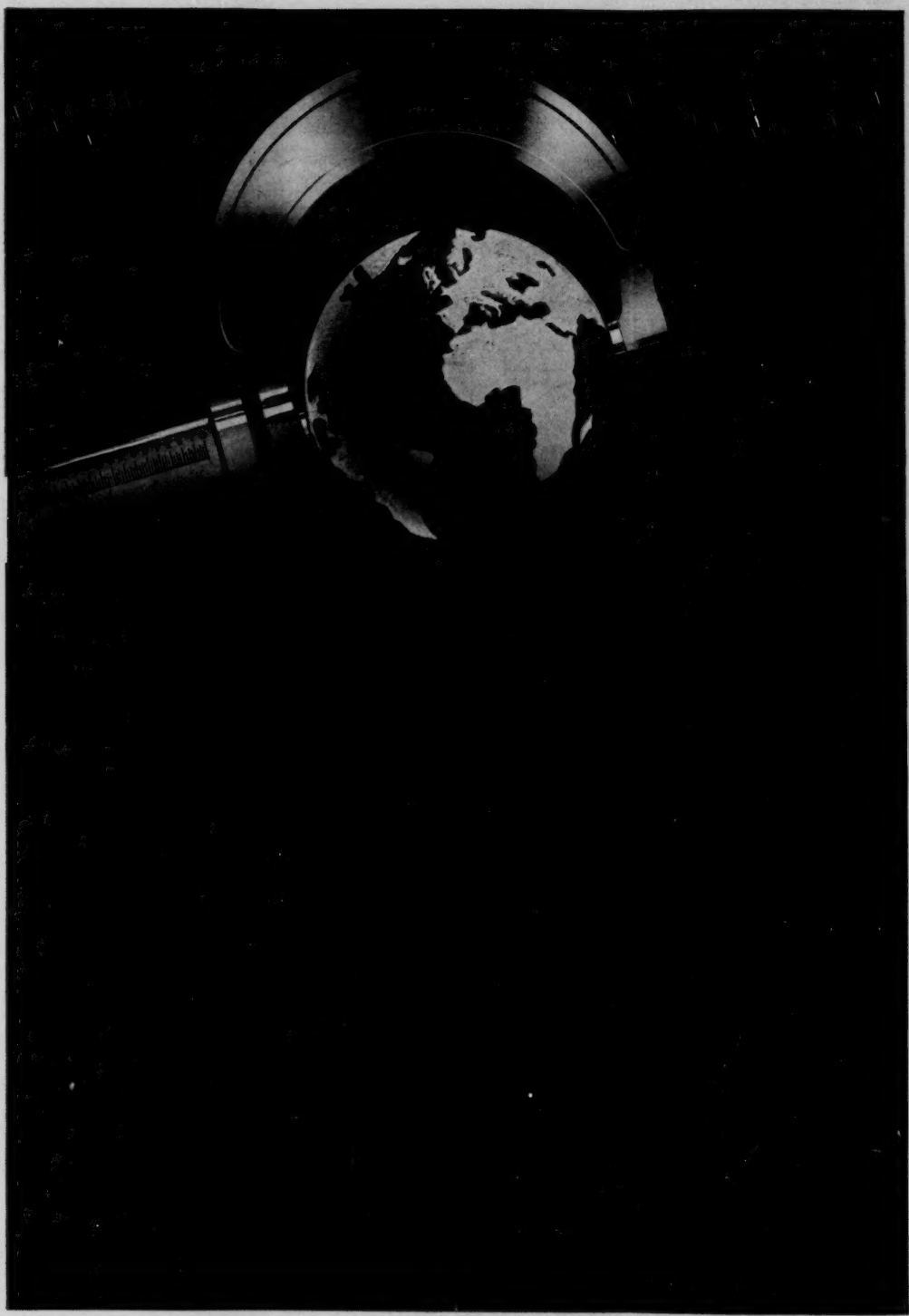
Reef	Available			Shaft and Safety Pillars			Total		
	Tons (000s)	Value Dwt.	Width Inches	Tons (000s)	Value Dwt.	Width Inches	Tons (000s)	Value Dwt.	Width Inches
Main Reef	1,413	3.6	54.2	977	3.5	60.6	2,390	3.5	56.7
Main Reef Leader	1,055	4.3	48.4	948	4.2	46.7	2,003	4.3	47.5
Composite Reef	3,736	6.2	46.5	1,104	4.4	57.4	4,840	5.8	48.6
South Reef	739	3.6	50.7	284	3.9	58.7	1,023	3.7	52.7
Total ...	6,943	5.1	48.6	3,313	4.1	54.7	10,256	4.8	50.4

Compared with the previous year's estimate, the available reserve shows a decrease of **112,000** tons, the value and width being higher by **0.3** dwt. and **0.2** in. respectively.

The total reserve decreased by **375,000** tons of which **278,000** tons was due to the rise in costs and consequent increase in the pay limit.

The full Report and Accounts may be obtained from the Secretaries of the European Committee, A. MOIR & CO., 4, London Wall Buildings, E.C.2.

Metal and Mineral Trades



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